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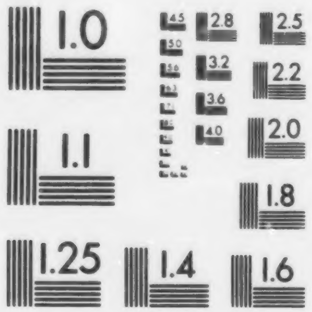

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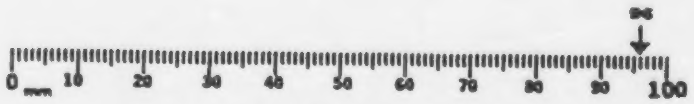

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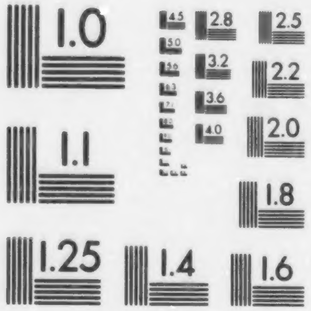

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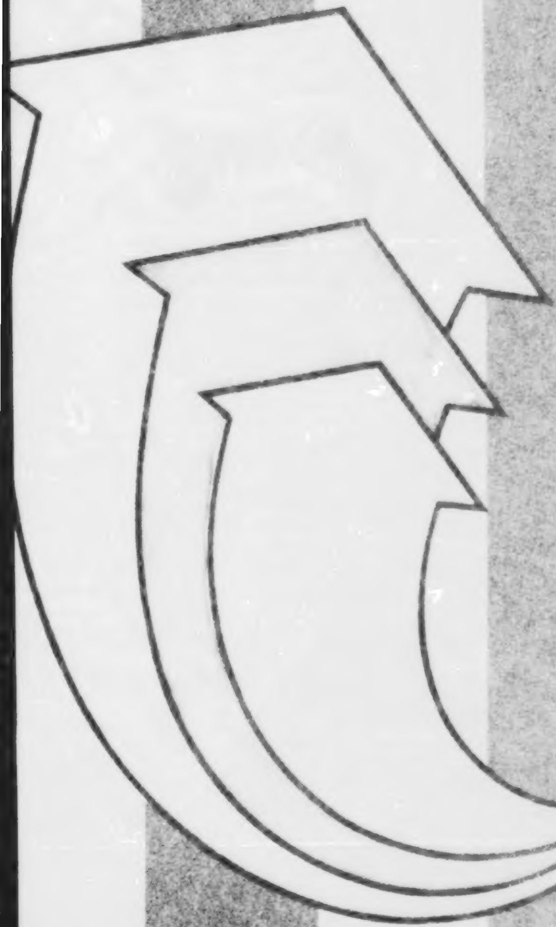
# THE EARLY EDUCATION PROJECT EXECUTIVE SUMMARY

By Gerard M. Kysela, Ph.D.



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SUMMER 1978

**Planning and Research**

Alberta
EDUCATION

# EXECUTIVE SUMMARY

## THE EARLY EDUCATION PROJECT

A home and school approach for infants and pre-school children exhibiting developmental handicaps.

Gerard M. Kysela, Ph. D.

Centre for the Study of Mental Retardation

in collaboration with

Kathleen Daly
Martha Doxsey-Whitfield
Alex Hillyard
Linda McDonald
Susan McDonald
Sandy Pentland
Julie Taylor

with the assistance of

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Under contract to Alberta Education, Edmonton, Alberta, Canada

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# ABSTRACT

The Early Education Project consisted of a home and school approach to early intervention with moderate to severely handicapped children. A home-based parent training program incorporating infant teaching/learning intervention systems was combined with a school-based classroom project for toddlers and preschoolers to provide instruction in early childhood skills and knowledge. The program employed a developmental task analyzed curriculum with a criterion-referenced assessment method to determine a child's competencies and skills and to identify the goals of the intervention in behavioral terms. The children participating exhibited moderate to severe developmental handicaps; four major areas of teaching/learning included language skills and concepts, motor skills, cognitive skills and concepts, and self-help skills.

Following the criterion-referenced assessment, the test-teach methods of direct and incidental instruction were implemented to provide an instructional format for teaching, maintaining, and elaborating new knowledge and skills. Parents in the home program and teachers in the school program employed these methods to teach and maintain the new skills and knowledge. A standard program construction format and implementation procedure ensured consistent and continuous instruction by both parents and teachers. Each child's progress was monitored through the use of a standard data collection format allowing for behavioral analysis of the effects

of intervention. The parent training model employed in the home program provided for the gradual introduction of the parent to concepts and skills of using antecedent and consequent control for the children's learning as well as data collection, assessment, and program writing. In the home program and the toddler and preschool classrooms direct and incidental instruction was provided in the areas of language, self-help skills, cognitive skills, and motor development.

The results of the project provided essential data with respect to two very important dimensions of early intervention. First, the normative data indicated that children's rate of achieving developmental milestones was significantly accelerated in mental development and language development for the school program and in the area of mental development for the home program. Secondly, the behavioral data demonstrated the profound and rapid increases in knowledge and skill attained by the moderately/severely handicapped children when they were directly taught these skills and knowledge. The use of a data-based system of instruction ensured the capacity to individually tailor and modify programs to suit individual children's needs. Several experimental investigations during the project demonstrated the specific effects of the intervention procedures facilitating the children's acquisition of new skills. The use of parents as the primary teachers in the home-based early intervention program and the extensive gains made by the infants as a result of this intervention strongly supported the use of a home-based aspect of the project for children as soon as the handicapping condition was identified. Indeed, the behavioral data provided examples of instances in which children in the home program were being taught the same skills and concepts as those being taught to children in the school-based program. Thus, earlier intervention resulted in the acquisition of these skills at an earlier age by the children involved.

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In recent years, many investigators have initiated programs in the early infant and preschool years with handicapped persons, attempting to attenuate or eliminate the extensive retardation which has occurred with moderately to severely handicapping conditions (Bricker and Bricker, 1976; Fredericks et al, 1976; Guess, Sailor, and Baer, 1976; Hayden and Haring, 1976). The present research and development project, the Early Education Project, was an attempt to extend the material found in this early intervention literature and to systematize the approach to early intervention programing with handicapped children and their families. Thus, there was a developmental component in this study, involving the establishment of methods and techniques of early intervention with families and preschool age children. The literature in this field is limited with respect to systematic methods and programs one can implement. That is, although there are general descriptions of approaches taken to early intervention, as well as very specific programs working on one or two behaviors, there is not a great deal of literature about general systems that are applicable to teach a broad variety of skills and knowledge to preschool children, nor are there general models of parent training available to enable the parents of very young infants and toddlers to teach their children these very important developmental concepts and skills. Thus, the project's major emphasis was the development of a systematic and

effective approach to early intervention with the moderately to severely handicapped child.

In the process of developing these methods and techniques, it was felt essential to provide at least partial validation and evaluation of these approaches. Thus a major component of the project involved a number of research characteristics, namely, evaluation of children's normal growth over the course of involvement in the project, as well as specific behavioral analysis of the effects of the intervention process on the child's development. Thus, a second major objective was investigating the impact of the intervention process on the family and the child's development within the family.

The third and perhaps most fundamental aspect of the project involved the development of a service for early intervention with families in the community which would enable the moderately to severely handicapped child to reside more adequately within the context of their family and their community. The report will provide details about this service to forty-five families in the Edmonton area who participated in the project. In the long run, it will be the adequacy of this model's use with families in assisting the maintenance of the moderately to severely handicapped child at home which will be the most significant development from our work.

## The Nature of Early Intervention

In reviewing the above mentioned literature on early intervention with the handicapped, Berkson and Landesman-Dwyer (1977) have indicated that the major emphasis in developing programs for the moderately to severely handicapped has been an applied behavior analysis approach to this field in the last fifteen years. The use of this behavioral model seems to have been successful because of the reliance upon empirical (experimental) evaluation of treatment procedures and methodologies. In utilizing an early intervention orientation of an applied behavior analysis approach, Bijou (1975) has suggested the following five steps as being characteristic:

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In order to achieve these five basic steps for early intervention, the Early Education Project developed several approaches and techniques, in part stemming from previous research, and in part stemming from developments the project staff carried out themselves.

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Thus, the problems that were examined as a part of this project include the development and use of the criterion-referenced assessment device and the developmental curriculum, the development and evaluation of the direct teaching model associated with the program implementation, the use of standard data collection methods for both parents at home and teachers in school, in order to ensure consistency across instructional situations and instructional staff. These methods and approaches were then evaluated through measures of the children's developmental progress on standardized assessment devices, as well as in terms of their acquisition of new skills and knowledge through behavioral and performance assessments. These data served as the source of information for subsequent evaluation of program effectiveness and more generally, of the effects of the early intervention process itself. One limitation of this methodology was the lack of a control group with which the children involved in this project's progress could be compared; thus, in most instances, the children served as their own control comparisons as these between group comparisons were not viable within the context of the present evaluation.

## THE SCOPE OF THE EARLY EDUCATION PROJECT

In order to establish the Early Education Project as an early intervention program, several phases of development were required. First of all, a staff training program was initiated, covering areas of behavior modification in teaching, particular testing and teaching models employed in the project, and program writing and development skills. This staff training program is the subject of further study and development at this time as it has not yet attained final status. However, it was necessary to develop this approach in order to ensure consistent staff training and consistent skill attainment by the staff members for implementation of the project.

Subsequent to the development of the staff training programs, a parent training program was developed, both for the home and the school aspects of the project. This will be more specifically explained in the results segment of the report, but did include a training program in school for the parents of children at school, as well as an ongoing parent training program in the home project to assist the parents in developing and maintaining skills in teaching their children.

Teaching programs were developed stemming from endeavours carried on by others in this field (e.g. Fredericks et al, 1976) with the initial starting point of a developmental curriculum of behaviorally described objectives for learning.

## The Children in the Early Education Project

During the course of the eighteen months the Early education Project was in operation, over forty-five children, between birth and five and one-half years of age were identified to participate in the program. Two aspects of service delivery were decided upon when the project was initiated. Children from the ages of birth to approximately two years of age were to be involved in a home-based parent training program in which home teachers served as resource persons to parents teaching their children and assisting them in developing in one of the four areas of the developmental curriculum. For children from approximately two years of age until six, a school-based program was established at the Mayfield Public School, a school of the Edmonton Public School System, in which two classrooms were renovated and modified to serve as early education classrooms for toddler and preschool age children.

In the home program, specifically, twenty-six children between the ages of birth and three and one-half years were involved with varying degrees of service. Typically, however, data will be presented from twenty-two children's progress over the course of the project, because four children moved from the home program to the school program. Thus, information about their growth and development and learning will be presented under the school program for the most part.

The intervention method chosen for children between two and six years of age was a school-based early education classroom. Children attended classroom four or five half days a week at a public school located in Edmonton, Alberta. This program was offered to children between the ages of twenty months and six years, as it was felt that children younger than twenty months would not benefit from travel to a centralized facility as much as they would from parent training at home. Thus, three classes of children attended this school during the morning and afternoon each day, being brought there by cab or handi-bus.

## Results

The behavioral data from the home program provides three rather salient and crucial findings regarding the Early Education Project specifically and early intervention generally. First, very young moderate/severely handicapped children can definitely be taught skills/concepts very early in their lives successfully by their parents. These parent-teachers can manage teaching programs and monitor their child's progress quite effectively. Secondly, the learning process the child experiences when the direct teaching model is employed results in very rapid learning with very few errors in most instances, as the child masters new concepts and skills. This finding affirms the value and utility of the Test-Teach Method developed by the staff of the project as an effective and very positive approach to teaching. Punishment procedures were unnecessary as a method when these direct teaching procedures were systematically applied to assist the children's development. Thirdly, the children exhibited very high levels of retention when assessed following mastery of a program demonstrating the intact and functional memory skills they possess. Coupled with this finding, the parent's view of the application of these skills and knowledge to the child's natural environment greatly enhances the ecological validity and significance of this process.

The behavioral data in the classroom aspect of the Early

Education Project provides very significant information regarding the children's capabilities and the early intervention model's effectiveness. In the language instruction area, extensive gains were made with respect to initial verbal imitation training, early referential functions of language skills, self-initiated controlling aspects of language with others, and in some children's cases, extended functions including action referents and pronoun descriptions. Logical use of affirmative/negation indices were also acquired by seven children. Thus, extensive aspects of functional language were acquired by the children during the course of the project. In addition several areas of both comprehension and expression of language were expanded with the incidental teaching procedures.

In the area of cognitive development, the children for the most part moved through the operations and operations with distractors programs enhancing their receptive language communication with adults and expanding their environmental exploratory skills. They learned several levels of self-identification and awareness and other-awareness through the body parts identification program. Stacking and puzzles programs resulted in more extensive participation in environmental activities as did the lacing programs. Through the writing and classification programs, the children were acquiring school-related basic skills. In the self-help areas, many dressing skills were mastered by the children as well as components of the personal hygiene skills (washing and drying), toiletting programs, and eating skills programs. Thus, in all children's cases, progress was made in terms of many new skills and concepts being acquired; in addition, skills for surviving in the public schools were gradually being acquired. Five students from the preschool classroom transferred to special programs in the public school system at the termination of the project.

The results provided two other major points. First, many programs required relatively few days to criterion and trials to criterion indicating the tremendous learning capacity the children have even with moderate to severe handicaps. In addition, the children maintained these skills and knowledge over several weeks of follow-up supporting the notion that their memory processes were indeed effective. Secondly, very few errors occurred during the teaching programs in many cases due to the use of the extensive prompting and guidance procedures; this level of correct performance was maintained in several teaching areas even when the children were learning discriminative responses. Thus, it is clearly unnecessary to use negative or aversive procedures to obtain rather rapid learning of new skills and knowledge with children having moderate to severe handicaps.

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By Gerard M. Kysela, Ph.D.

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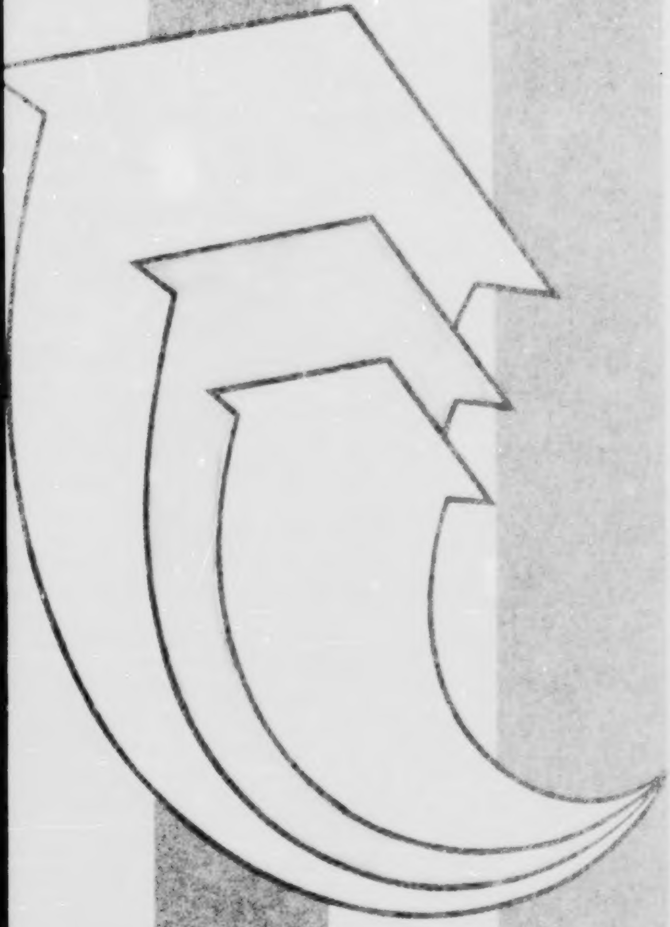

Planning and Research

Alberta

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**CENTRE FOR THE STUDY OF MENTAL RETARDATION**
**THE UNIVERSITY OF ALBERTA, EDMONTON, CANADA T6G 2G5**

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Dr. I. Hastings, Director
Early Childhood Services
Alberta Education
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Edmonton, Alberta
T5J 2V2

Dear Sirs:

I have forwarded to Dr. C. Rhodes the final report of the Early Education Project which was contracted through the Centre for the Study of Mental Retardation and your department two years ago.

The Steering Committee has approved this report at it's last meeting; if there are any questions regarding it's contents please contact me at your convenience at 432-5026.

Thank you very much for your cooperation and assistance throughout the period of this investigation.

Very sincerely yours,

Gerard M. Kysela

Gerard M. Kysela, Ph. D.
Professor

AN INTERDISCIPLINARY RESEARCH CENTRE, CO-SPONSORED BY
THE UNIVERSITY OF ALBERTA AND THE CANADIAN ASSOCIATION FOR THE MENTALLY RETARDED

Under contract to Alberta Education

Edmonton, Alberta

CANADA

Project #A0807

Completion Date: September 1, 1977

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In order to achieve these five basic steps for early intervention, the Early Education Project developed several approaches and techniques, in part stemming from previous research, and in part stemming from developments the project staff carried out themselves.

The goals of teaching and learning were specified in observable terms through the use of a behaviorally-based developmental curriculum specifying the objectives for teaching from birth to approximately five to six years of age. This curriculum then served as the basis for a criterion-referenced assessment procedure which was employed to determine the child's initial level of competence in behavioral terms. The behavior modification methodologies were employed as well as a standard program construction and implementation procedure in order to arrange a consistent teaching situation to facilitate learning. A systematic data collection format to monitor behaviors being taught was employed to evaluate the child's learning progress throughout teaching, either at home or in the school, and changes were made to programs in order to advance the child's learning to mastery of the skills being taught or the knowledge being learned. The development of an incidental teaching framework provided assistance to maintain and generalize new behaviors or skills acquired in order to elaborate and maintain the knowledge and skills children were being taught.

Thus, the problems that were examined as a part of this project include the development and use of the criterion-referenced assessment device and the developmental curriculum, the development and evaluation of the direct teaching model associated with the program implementation, the use of standard data collection methods for both parents at home and teachers in school, in order to ensure consistency across instructional situations and instructional staff. These methods and approaches were then evaluated through measures of the children's developmental progress on standardized assessment devices, as well as in terms of their acquisition of new skills and knowledge through behavioral and performance assessments. These data served as the source of information for subsequent evaluation of program effectiveness and more generally, of the effects of the early intervention process itself. One limitation of this methodology was the lack of a control group with which the children involved in this project's progress could be compared; thus, in most instances, the children served as their own control comparisons as these between group comparisons were not viable within the context of the present evaluation.

## THE SCOPE OF THE EARLY EDUCATION PROJECT

In order to establish the Early Education Project as an early intervention program, several phases of development were required. First of all, a staff training program was initiated, covering areas of behavior modification in teaching, particular testing and teaching models employed in the project, and program writing and development skills. This staff training program is the subject of further study and development at this time as it has not yet attained final status. However, it was necessary to develop this approach in order to ensure consistent staff training and consistent skill attainment by the staff members for implementation of the project.

Subsequent to the development of the staff training programs, a parent training program was developed, both for the home and the school aspects of the project. This will be more specifically explained in the results segment of the report, but did include a training program in school for the parents of children at school, as well as an ongoing parent training program in the home project to assist the parents in developing and maintaining skills in teaching their children.

Teaching programs were developed stemming from endeavours carried on by others in this field (e.g. Fredericks et al, 1976) with the initial starting point of a developmental curriculum of behaviorally described objectives for learning.

## The Children in the Early Education Project

During the course of the eighteen months the Early education Project was in operation, over forty-five children, between birth and five and one-half years of age were identified to participate in the program. Two aspects of service delivery were decided upon when the project was initiated. Children from the ages of birth to approximately two years of age were to be involved in a home-based parent training program in which home teachers served as resource persons to parents teaching their children and assisting them in developing in one of the four areas of the developmental curriculum. For children from approximately two years of age until six, a school-based program was established at the Mayfield Public School, a school of the Edmonton Public School System, in which two classrooms were renovated and modified to serve as early education classrooms for toddler and preschool age children.

In the home program, specifically, twenty-six children between the ages of birth and three and one-half years were involved with varying degrees of service. Typically, however, data will be presented from twenty-two children's progress over the course of the project, because four children moved from the home program to the school program. Thus, information about their growth and development and learning will be presented under the school program for the most part.

The intervention method chosen for children between two and six years of age was a school-based early education classroom. Children attended classroom four or five half days a week at a public school located in Edmonton, Alberta. This program was offered to children between the ages of twenty months and six years, as it was felt that children younger than twenty months would not benefit from travel to a centralized facility as much as they would from parent training at home. Thus, three classes of children attended this school during the morning and afternoon each day, being brought there by cab or handi-bus.

## Results

The behavioral data from the home program provides three rather salient and crucial findings regarding the Early Education Project specifically and early intervention generally. First, very young moderate/severely handicapped children can definitely be taught skills/concepts very early in their lives successfully by their parents. These parent-teachers can manage teaching programs and monitor their child's progress quite effectively. Secondly, the learning process the child experiences when the direct teaching model is employed results in very rapid learning with very few errors in most instances, as the child masters new concepts and skills. This finding affirms the value and utility of the Test-Teach Method developed by the staff of the project as an effective and very positive approach to teaching. Punishment procedures were unnecessary as a method when these direct teaching procedures were systematically applied to assist the children's development. Thirdly, the children exhibited very high levels of retention when assessed following mastery of a program demonstrating the intact and functional memory skills they possess. Coupled with this finding, the parent's view of the application of these skills and knowledge to the child's natural environment greatly enhances the ecological validity and significance of this process.

The behavioral data in the classroom aspect of the Early

Education Project provides very significant information regarding the children's capabilities and the early intervention model's effectiveness. In the language instruction area, extensive gains were made with respect to initial verbal imitation training, early referential functions of language skills, self-initiated controlling aspects of language with others, and in some children's cases, extended functions including action referents and pronoun descriptions. Logical use of affirmative/negation indices were also acquired by seven children. Thus, extensive aspects of functional language were acquired by the children during the course of the project. In addition several areas of both comprehension and expression of language were expanded with the incidental teaching procedures.

In the area of cognitive development, the children for the most part moved through the operations and operations with distractors programs enhancing their receptive language communication with adults and expanding their environmental exploratory skills. They learned several levels of self-identification and awareness and other-awareness through the body parts identification program. Stacking and puzzles programs resulted in more extensive participation in environmental activities as did the lacing programs. Through the writing and classification programs, the children were acquiring school-related basic skills. In the self-help areas, many dressing skills were mastered by the children as well as components of the personal hygiene skills (washing and drying), toiletting programs, and eating skills programs. Thus, in all children's cases, progress was made in terms of many new skills and concepts being acquired; in addition, skills for surviving in the public schools were gradually being acquired. Five students from the preschool classroom transferred to special programs in the public school system at the termination of the project.

The results provided two other major points. First, many programs required relatively few days to criterion and trials to criterion indicating the tremendous learning capacity the children have even with moderate to severe handicaps. In addition, the children maintained these skills and knowledge over several weeks of follow-up supporting the notion that their memory processes were indeed effective. Secondly, very few errors occurred during the teaching programs in many cases due to the use of the extensive prompting and guidance procedures; this level of correct performance was maintained in several teaching areas even when the children were learning discriminative responses. Thus, it is clearly unnecessary to use negative or aversive procedures to obtain rather rapid learning of new skills and knowledge with children having moderate to severe handicaps.

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# EARLY EDUCATION PROJECT

Final Report

to

Alberta Education

Early Childhood Services

Planning and Research

A home and school based program for infants and pre-school children exhibiting developmental handicaps.

Submitted by:

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## PURPOSE OF THE STUDY

In recent years, many investigators have initiated programs in the early infant and preschool years with handicapped persons, attempting to attenuate or eliminate the extensive retardation which has occurred with moderately to severely handicapping conditions (Bricker and Bricker, 1976; Fredericks et al, 1976; Guess, Sailor, and Baer, 1976; Hayden and Haring, 1976). The present research and development project, the Early Education Project, was an attempt to extend the material found in this early intervention literature and to systematize the approach to early intervention programing with handicapped children and their families. Thus, there was a developmental component in this study, involving the establishment of methods and techniques of early intervention with families and preschool age children. The literature in this field is limited with respect to systematic methods and programs one can implement. That is, although there are general descriptions of approaches taken to early intervention, as well as very specific programs working on one or two behaviors, there is not a great deal of literature about general systems that are applicable to teach a broad variety of skills and knowledge to preschool children, nor are there general models of parent training available to enable the parents of very young infants and toddlers to teach their children these very important developmental concepts and skills. Thus, the project's major emphasis was the development of a systematic and effective approach to early intervention with the moderately to severely handicapped child.

In the process of developing these methods and techniques, it was felt essential to provide at least partial validation and evaluation of these approaches. Thus a major component of the project involved a number of research characteristics, namely, evaluation of children's normal growth over the course of involvement in the project, as well as specific behavioral analysis of the effects of the intervention process on the child's development. A second major objective was investigating the impact of the intervention process on the family and the child's development within the family.

The third and perhaps most fundamental aspect of the project involved the development of a service for early intervention with families in the community which would enable the moderately to severely handicapped child to reside more adequately within the context of their family and their community. The report will provide details about this service to forty-five families in the Edmonton area who participated in the project. In the long run, it will be the adequacy of this model's use with families in assisting the maintenance of the moderately to severely handicapped child at home which will be the most significant development from our work.

## The Nature of Early Intervention

In reviewing the above mentioned literature on early intervention with the handicapped, Berkson and Landesman-Dwyer (1977) have indicated that the major emphasis in developing programs for the moderately to severely handicapped has been an applied behavior analysis approach to this field in the last fifteen years. The use of this behavioral model seems to have been successful because of the reliance upon empirical (experimental) evaluation of treatment procedures and methodologies. In utilizing an early intervention orientation of an applied behavior analysis approach, Bijou (1975) has suggested the following five steps as being characteristic:

(1) Specifying the goals of teaching and learning in observable terms;
(2) Beginning teaching at the child's level of competence;
(3) Arranging the teaching situation to facilitate learning (instructional procedures, materials, setting factors and contingencies);
(4) Monitoring learning progress and making changes to advance learning;
(5) Following practices that generalize, elaborate, and maintain the behaviors acquired.

In order to achieve these five basic steps for early intervention, the Early Education Project developed several approaches and techniques, in part stemming from previous research, and in part stemming from developments the project staff carried out themselves.

The goals of teaching and learning were specified in observable terms through the use of a behaviorally-based developmental curriculum specifying the objectives for teaching from birth to approximately five to six years of age. This curriculum then served as the basis for a criterion-referenced assessment procedure which was employed to determine the child's initial level of competence in behavioral terms. The behavior modification methodologies were employed as well as a standard program construction and implementation procedure in order to arrange a consistent teaching situation to facilitate learning. A systematic data collection format to monitor behaviors being taught was employed to evaluate the child's learning progress throughout teaching, either at home or in the school, and changes were made to programs in order to advance the child's learning to mastery of the skills being taught or the knowledge being learned. The development of an incidental teaching framework provided assistance to maintain and generalize new behaviors or skills acquired in order to elaborate and maintain the knowledge and skills children were being taught. The following discussions will elaborate the use of these methods and approaches in the Early Education Project and the detailed materials will be presented in appendices attached to this final report.

Thus, the problems that were examined as a part of this project include the development and use of the criterion-referenced assessment device and the developmental curriculum, the development and evaluation of the direct teaching model associated with the program implementation, the use of standard data collection methods for both parents at home and teachers in school, in order to ensure consistency across instructional situations and instructional staff. These methods and approaches were then evaluated through measures of the children's developmental progress on standardized assessment devices, as well as in terms of their acquisition of new skills and knowledge through behavioral and performance assessments. These data served as the source of information for subsequent evaluation of program effectiveness and more generally, of the effects of the early intervention process itself. One limitation of this methodology was the lack of a control group with which the children involved in this project's progress could be compared; thus, in most instances, the children served as their own control comparisons as these between group comparisons were not viable within the context of the present evaluation.

## THE SCOPE OF THE EARLY EDUCATION PROJECT

In order to establish the Early Education Project as an early intervention program, several phases of development were required. First of all, a staff training program was initiated, covering areas of behavior modification in teaching, particular testing and teaching models employed in the project, and program writing and development skills. This staff training program is the subject of further study and development at this time as it has not yet attained final status. However, it was necessary to develop this approach in order to ensure consistent staff training and consistent skill attainment by the staff members for implementation of the project.

Subsequent to the development of the staff training programs, a parent training program was developed, both for the home and the school aspects of the project. This will be more specifically explained in the results segment of the report, but did include a training program in school for the parents of children at school, as well as an ongoing parent training program in the home project to assist the parents in developing and maintaining skills in teaching their children.

Teaching programs were developed stemming from endeavours carried on by others in this field (e.g. Fredericks et al, 1976) with the initial starting point of a developmental curriculum of behaviorally described objectives for learning.

## Developmental Curriculum

The developmental curriculum which served as the basis for specifying the goals of teaching is a sequence of behaviors in five areas of development: language, motor, cognition, self-help, and socialization skills (see Table 1). The content of the curriculum originated initially from the Portage Guide

## TABLE 1

### FIVE AREAS OF THE DEVELOPMENTAL CURRICULUM

| | |
|---|---|
| Cognition: | ability to remember, see, or hear likeness and difference, and to determine relationships between ideas and things. |
| Self-help: | behaviors enabling child to care for himself in areas of eating, dressing, bathing, and toileting. |
| Motor: | concerned with coordinated movements of large and small muscles. |
| Language: | ability to receive and understand information-showing meaning through speech and gestures. |
| Socialization: | concerned with appropriate interpersonal behaviors with adults and peers. |

(Shearer et al, 1972); however, considerable modifications to this original framework have been made by adopting materials from other curricula especially in the areas of motor development, language, self-help and cognition; in addition a different sequencing procedure was employed. Each developmental area consists of a sequence of strands or clusters of behaviors which represent a progression from simple to complex behaviors leading to a terminal behavioral objective (see Table 2 for examples from early motor development). The curriculum modified from the Portage Guide (Shearer et al, 1972) attempts to represent functional behavioral goals, skills, and knowledge in each area of development such that once acquired these skills and knowledge will aid in more typical developmental progress for the delayed child. Appendix A presents the objectives for the four major teaching areas from the project.

These objectives in the developmental curriculum thus served as a means of identifying the sequence of instructional objectives for determining whether to initiate programing with the children in the project. Their parents or the teachers in the school program were able to thus see the direction of teaching at any one point in time in terms of overall objectives of the teaching, as well as specific short term objectives of a particular instructional program.

## The Children in the Early Education Project

During the course of the eighteen months the Early Education

## TABLE 2

## STRANDS OF TERMINAL OBJECTIVES AND SUB-SKILLS FOR EARLY MOTOR DEVELOPMENT*

1. Controlled Eye Movements

| | 1 | 2 | 3 |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

A. Looks at object in hands (P15A)

(1) eye movements on back (P5)

(2) looks and holds (P7A)

(3) looks at hands (P14)

2. Head Control Prone

| | 1 | 2 | 3 |
|---|---|---|---|
| | | | |
| | | | |

A. Holds head and chest up 15 seconds prone on elbows (P13)

(1) holds head up 5 seconds (P6)

| | | | |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

B. Lifts head - prone on elbows

(1) raises head within 10 seconds (P2)

(2) raises head within 5 seconds prone on elbows (P8)

| | | | |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

C. Turns head and reaches for toy prone on elbows

(1) head turning (P3)

(2) raises head (P8)

*See Appendix A for complete list of objectives

Project was in operation, over forty-five children, between birth and five and one-half years of age were identified to participate in the program. Two aspects of service delivery were decided upon when the project was initiated. Children from the ages of birth to approximately two years of age were to be involved in a home-based parent training program in which home teachers served as resource persons to parents teaching their children and assisting them in developing in one of the four areas of the developmental curriculum. For children from approximately two years of age until six, a school-based program was established at the Mayfield Public School, a school of the Edmonton Public School System, in which two classrooms were renovated and modified to serve as early education classrooms for toddler and preschool age children.

In the home program, specifically, twenty-six children between the ages of birth and three and one-half years were involved with varying degrees of service. Typically, however, data will be presented from twenty-two children's progress over the course of the project, because four children moved from the home program to the school program. Thus, information about their growth and development and learning will be presented under the school program for the most part. Table 3 presents a summary of the sex, date of birth, residential location, program involvement, material on medical problems, as well as an indication of skills in walking, dressing, toileting, and speech of the twenty-two children involved in the home program as of June 1,

## TABLE 3

## DESCRIPTION OF HOME PROGRAM CHILDREN

| Sex | D.O.B. | Residence | Day Program | Medical Problems (Elaborate) | Ambulatory | Dressing Skills | Toilet Training | Speech |
|---|---|---|---|---|---|---|---|---|
| M | 19/12/75 | Home | EEP | Gastrointestinal | No | No | No | No |
| F | 29/6/75 | Rosecrest | EEP | Heart | No | No | No | No |
| M | 31/3/75 | Home | EEP | Heart | Yes | No | No | No |
| F | 31/12/74 | Rosecrest | EEP | Heart | No | No | No | No |
| M | 9/8/74 | Home | EEP | Heart | No | No | No | No |
| M | 27/3/75 | Home | EEP | Respiratory | No | No | No | No |
| F | 6/3/77 | Home | EEP | Heart Disorders | No | No | No | No |
| M | 22/1/75 | Home | EEP | Respiratory | No | No | No | No |
| F | 2/4/75 | Home | EEP | Heart | No | No | No | No |
| F | 29/5/75 | Home (foster) | EEP | No | No | No | No | No |
| M | 2/6/74 | Home | EEP | No | No | No | No | No |
| M | 13/1/75 | Home | EEP | Heart | Yes | No | No | No |
| M | 25/7/76 | Home | EEP | No | No | No | No | No |
| F | 20/3/76 | Home | EEP | No | No | No | No | No |
| F | 9/1/75 | Home | EEP | Hypothyroid | No | No | No | No |
| F | 8/4/76 | Home | EEP | Heart | No | No | No | No |
| F | 13/6/75 | Home | EEP | No | No | No | No | No |
| M | 28/12/74 | Home | EEP | Congenital Heart | No | No | No | No |
| M | 15/1/76 | Home | EEP | No | No | No | No | No |
| M | 18/12/77 | Home | EEP | Congenital Heart | No | No | No | No |
| M | 21/1/76 | Home | EEP | No | No | No | No | No |
| M | 16/8/76 | Home | EEP | No | No | No | No | No |

1977. As can be seen in this table, many of the children in the home program had other medical difficulties in addition to Downs' Syndrome, which were contributing to difficulties of growth and development. As is indicated in the table, most of the children were quite young when early intervention was initiated. In addition, most of the children, of course, were unable to function in terms of crawling or walking, speech, self help skills such as dressing and toileting.

The intervention method chosen for children between two and six years of age was a school-based early education classroom. Children attended classroom four or five half days a week at a public school located in Edmonton, Alberta. This program was offered to children between the ages of twenty months and six years, as it was felt that children younger than twenty months would not benefit from travel to a centralized facility as much as they would from parent training at home. Thus, three classes of children attended this school during the morning and afternoon each day, being brought there by cab or handi-bus. Data regarding the children's sex, date of birth, residence, medical problems, and general functioning in walking, dressing, toileting, and speech are provided in Table 4. Again, as can be seen from this table, although many of the children were walking, few of them had adequate dressing self help skills and many were unable to speak in order to function adequately in their environment. The program was initiated at the school as well as in family's homes on November 15, 1975. With the final classes during the last

# TABLE 4

## DESCRIPTION OF SCHOOL PROGRAM CHILDREN

| Sex | D.O.B. | Residence | Day Program | Medical Problems (Elaborate) | Ambu-latory | Dressing Skills | Toilet Training | Speech |
|---|---|---|---|---|---|---|---|---|
| M | 11/7/73 | Rosecrest | EEP | | Yes | Some | Partial | Some |
| M | 17/9/73 | Home | EEP | | Yes | Some | Partial | Some |
| M | 5/10/73 | Rosecrest | EEP | Heart/Speech | Yes | Some | Partial | Some |
| F | 23/11/73 | Foster home | EEP | | No | Some | Partial | Some |
| M | 9/1/74 | Home | EEP | | Yes | Some | Partial | Some |
| F | 8/2/74 | Home | EEP | Heart/Lung | Yes | Some | Partial | Some |
| M | 9/2/74 | Home | EEP | Heart disorder | No | Some | Partial | Some |
| M | 25/3/74 | Home | EEP | | Yes | Some | Partial | Some |
| M | 29/6/74 | Home | EEP | | Yes | Some | Partial | No |
| M | 22/1/74 | Rosecrest | EEP | Heart/cong. hip | No | No | No | No |
| M | 7/6/70 | Home | EEP | Bowel problems | Yes | Some | No | Some |
| F | 17/12/70 | Foster home and home | EEP | | Yes | Most | Yes | Some |
| F | 19/12/70 | Home | EEP | Heart/Vision | No | Most | Partial | Some |
| F | 4/6/71 | Home | EEP | Heart/Speech | Yes | Most | Yes | Some |
| M | 8/7/71 | Home | EEP | | Yes | Some | No | Some |
| M | 9/7/71 | Home | EEP | Visual/Speech | Yes | Some | Partial | Some |
| F | 15/10/71 | Home | EEP | | Yes | Most | Yes | Some |
| F | 8/4/72 | Home | EEP | | Yes | | Partial | Some |
| M | 13/9/72 | Rosecrest | EEP | Heart disorder | Yes | Some | No | No |
| F | 7/10/72 | Foster home and home | EEP | | Yes | Most | Yes | Some |
| M | 5/2/73 | Home | EEP | | Yes | Most | Yes | Some |
| F | 20/3/73 | Home | EEP | Heart disorder | Yes | Some | Yes | Some |
| M | 20/5/73 | Home | EEP | | Yes | Some | Yes | Some |

week of June, 1977; the home program continued until the end of July, 1977. Thus, the twenty-three children in the school program and the twenty-two children in the home program, constitute the forty-five persons involved in the Early Education Project over the twenty month period of the project.

## Staff

The personnel involved in the implementation and delivery of services constituting the Early Education Project included two teachers in the school program and one teacher in the home program, three developmental assistants, two of whom worked in the school program, and one working in the home program, a part-time secretary for typing and stenographic services, a co-ordinator, and seven research personnel involved from time to time in the collection of data and testing of children in the program. The staff members were given the staff training program in order to teach them the basic components of the behavior modification program as well as the specific methods and techniques of the project. Following this training, they were monitored periodically on the job to determine the general effectiveness with which they implemented programs and procedures.

An extremely valuable human resource participating in this program were the parents of the children in the home program. The parents, particularly the mothers, consistituted the teaching group for the youngsters between birth and two years of age in the home program. They were trained by the home teacher to teach and develop programs for their children in each of the developmental areas. Their efforts were responsible primarily for the progress and gains their children made. This characteristic of the project provides one of the unique human resource developments of this type of approach. That is, through parental training, a person in the child's life is trained to provide not only the specific teaching and instruction related to the project, but to provide assistance and teaching throughout the child's days and life at home.

## Implementation Procedures and Methods

This section of the report will describe the specific methodology involved in the criterion-referenced assessment, the direct teaching model for instruction, the program format employed in developing teaching material for parents and children, the data collection system, and the incidental teaching format for elaboration and generalization of skills the children have been taught.

### The Test-Teach Method: Criterion-Referenced Assessment

Employing the developmental curriculum, an assessment of the competencies or behaviors the child possesses is arranged; such information indicates to the teacher or parent where to begin programming and subsequent instruction.

The criterion-referenced assessment format provides a behavioral assessment of the child's knowledge and skills in several areas of development. This criterion-referenced format differs significantly from normative assessment procedures as well as standard criterion-referenced assessment procedures. Normative assessments compare a child's performance against other student's performance on the same test or norms established from a large group of students; whereas, criterion-referenced assessments measure student's progress in terms of accomplishing specific tasks which are sampled from the domain of tasks which indicate mastery of the behavioral objective (Snelbecker, 1974). The important difference lies in the criterion-referenced assessment's comparison of a child's performance to an externally-established standard or criterion rather than to the performance of other children. This assessment procedure provides directly relevant and functional information regarding a child's level of developmental competencies and as a result has direct implications for instruction.

The Test-Teach method of criterion-referenced assessment differs from standard formats through the sequential introduction of prompts and guidance to assess the child's skills even if the child is non-responsive at a spontaneous level; that is, prompts and physical assistance are gradually introduced attempting to determine how extensive intervention must be in order to obtain a response from the child. Thus, the level of remedial input required if the child is not responding at a spontaneous level is determined in the assessment procedure.

During the initial assessment each terminal behavior of curriculum is assessed to determine if it is within the teaching range of the student. The terminal behavioral objective is the final most complex behavior for that strand. Spontaneously responding at this level indicates competency in that skill or understanding of the particular concept or set of concepts. For example, in the language area, a terminal behavioral objective might read as follows:

> Child achieves 80% or more correct responses in a session of 32 trials or 12 correct responses in a row when asked "Whats that?" and presented with the following 16 stimuli singly: cookie, pants, ball, nose, chair, pop, shoe, car, tummy, table, apple, cup, top, mouth, spoon, drum.

Another objective in the cognitive development area would be as follows:

> The student will reach for, grasp, and retain a small object using a pincer grasp within five seconds of the teacher presenting that object to the child and saying "(child's name), you take".

The testing procedure for the criterion-referenced assessment incorporates the testing of each terminal behavior for successive strands starting with the first strand for each developmental area or at a point that seems appropriate for that child. First, for each behavioral objective, instructions, conditions for performance, standards of behavior and product, and the observable behavior required to indicate competencies on that skill or concept have been established (Anderson and Faust, 1973). These components of the behavioral objective are essential in order to have consistent assessment of the objective across examiners. Table 5 provides a series of behavioral objectives in the area of motor development. (See Appendix A for

## TABLE 5

## BEHAVIORAL OBJECTIVES IN THE MOTOR SKILL AREAS

1. Controlled Eye Movements

   A. After placing an object in the child's hand, he will focus his eyes on it within 5 seconds for a duration of 2 seconds (15A)

      (1) Eye movements on back
      Child will, while lying on his back, follow a moving object or a light held 15-20 cm. with his eyes from the centre two inches to the left and right side of his head.

      (2) Looks and holds
      Child will stare at tester's face for 5 seconds if it is within 15-25 cm. of child's eyes.

      (3) Looks at hands
      Child will bring his hands to his face and look at them for 2 seconds at least once during a one-minute observation session preceded by the tester touching the child's hands and bringing them in front of child's face.

2. Head Control Prone (on abdomen)

   A. Child will hold his head in full face forward position for 15 seconds if child is placed prone on elbows with head up within 5 seconds of being told to "look" and offered a toy within view.

      (1) Hold head up 5 seconds
      Child will hold his head in full face forward position for 5 seconds while prone if told to "look" and offered a toy held 1 foot from child at a height of 15 cm. within 5 seconds of command.

   B. If child is placed prone on elbows, he will lift his head up to full face forward position with 5 seconds if told to "look" and offered a toy within view.

      (1) Raises Head
      Child will raise his head 8 cm. off floor within 5 seconds of rattle sound made 15 cm. above head.

      (2) Raises Head
      Child will raise his head at least 15 cm. off matt to full face forward position while prone within 5 seconds of being told to "look" and offered a toy within view.

   C. If child is placed on elbows with head up, he will turn his head from side to side within 5 seconds of being told to "look" and offered a toy within view.

      (1) Head turning
      Child will turn his head from centre of body to R and L while prone within 5 seconds of rattle sound being presented.

complete objectives.)

Thus, for each terminal behavioral objective as well as each sub-objective, a criterion or standard is established to determine the presence of the skill or concept in the child's repertoire. This procedure ensures that the child's competency either through direct assessment or natural observation reliably meets or exceeds a pre-established criterion. For each objective assessed a set of instructions for task completion is presented to the child; this may be a verbal instruction alone or it may be a verbal instruction with the addition of a model by the teacher. The conditions for assessing performance are set out by the examiners as specified in the objective. This procedure thus constitutes the assessment portion of the competency based instructional model (Baine, 1977).

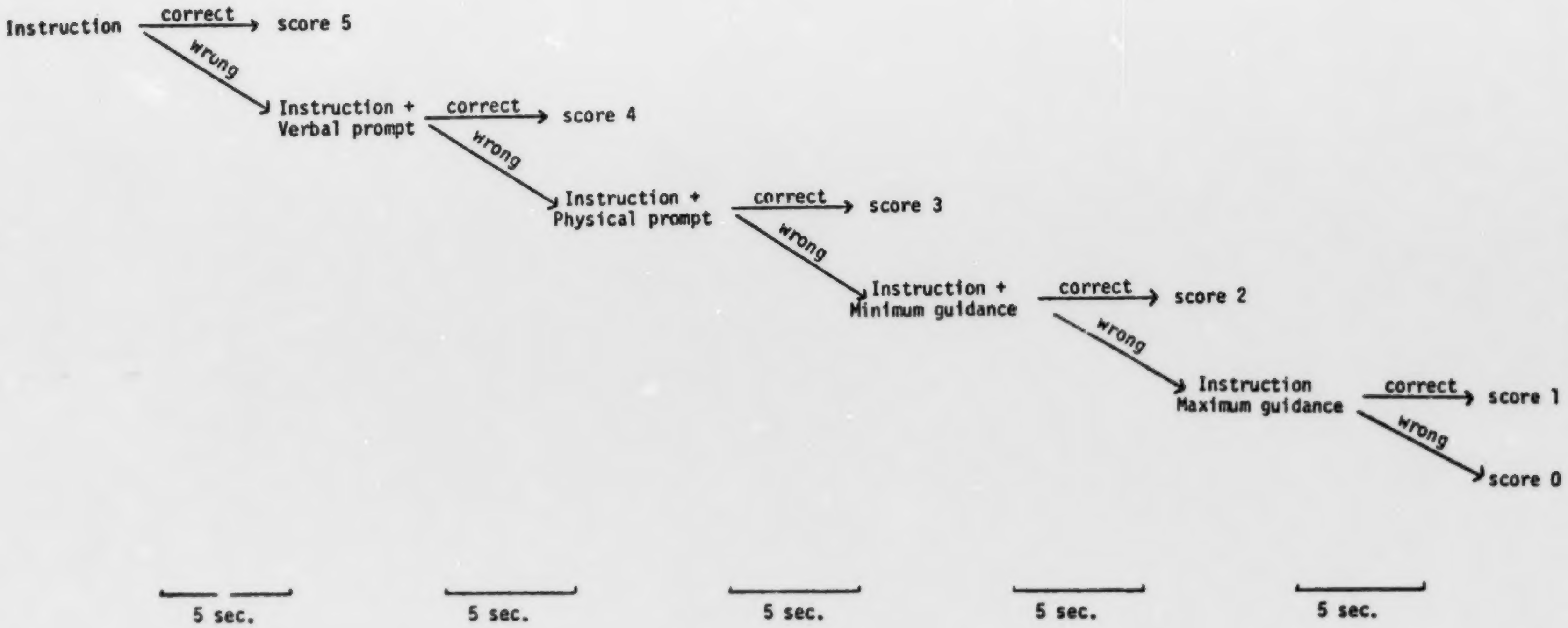
Secondly, the amount of prompting or assistance required to complete the behavioral objective is assessed within one of the following six levels. At each successive level there is the introduction of an increasing amount of prompting (cueing) and/or guidance given to the child (see Table 6).

Level 5 - The behavior is performed appropriately following the instruction without further prompting or guidance of any kind.

Level 4 - The behavior is performed appropriately following a repeat of the instruction and one or two additional verbal prompts after no response by the child or an incorrect response within 5 seconds of the initial instruction. Verbal prompts are repeated instructions or statements designed to initiate the

## TABLE 6

## ASSESSMENT SEQUENCE FOR THE INTRODUCTION OF PROMPTS AND GUIDANCE


Instruction
correct
score 5
wrong
Instruction + Verbal prompt
correct
score 4
wrong
Instruction + Physical prompt
correct
score 3
wrong
Instruction + Minimum guidance
correct
score 2
wrong
Instruction Maximum guidance
correct
score 1
wrong
score 0
5 sec.
5 sec.
5 sec.
5 sec.
5 sec.

behavior or focus the child's attention on salient or relevant aspects of the material (Becker, Engelmann, and Thomas, 1975a).

Level 3 - The behavior is performed appropriately in all respects after repetition of the instruction and the provision of one or two physical prompts or a model; this occurs if the child makes no response or an incorrect response after 5 seconds following level 4 instruction. Physical prompts are teacher-gestures or a model following the instruction or command which provide further prompts to the child in order to elicit the appropriate behavior (Becker, Engelmann, and Thomas, 1975a). Model cues are defined as the teacher or another child actually modelling or demonstrating the desired task. There is no physical contact between the teacher and child at this point.

Level 2 - The behavior is performed after instructional repetition and provision of minimum physical guidance if the child makes no response or an incorrect response after 5 seconds following level 3 instruction. Minimum physical guidance is defined as a teacher-initiated behavior where there is physical contact with the child - the degree of physical contact is assisting the child with one finger for a maximum of 5 seconds (Martin et al, 1975).

Level 1 - The behavior is performed appropriately after the teacher again repeats the instruction and provides more physical guidance following the lack of a child's response within 5 seconds or an incorrect response to level 2 guidance. More physical guidance refers to anything more than that defined at level 2 including hands-on guidance for a period of 5 seconds or leading the child through the behavior (Becker, Engelmann, and Thomas, 1975a; Martin et al, 1975).

Level 0 - Behavior is not performed in any respect following the physical guidance of level 1 for at least 5 seconds.

As can be seen in Table 6 procedures extend over a possible period of 25 seconds of assessment depending upon the child's responsiveness. This procedure is conducted three times for each objective to indicate the stability of the behavioral objective and determine the teaching level of the objective. The stability of the terminal behavioral objective is assessed as the lowest or most frequent level of assessment exhibited by the child on these three trials.

Upon completion of assessment, a terminal objective is considered to be within a child's teaching range if the child responds to minimum physical guidance or physical and/or verbal prompts by the teacher; that is, if the child's assessment is summarized as Levels 2, 3, or 4. The important point here being the child's performance at Levels 2, 3, or 4 indicates that the prerequisite skills are present but the child is not completely competent.

However, if the child is totally unable to perform the actions required to meet the terminal objective or requires maximum guidance from the teacher (i.e., Levels 0 to 1 on the assessment) then some subskills within the strand are assumed to be lacking and therefore should be further assessed and eventually taught. If the child performs at level 0 or 1 over three trials, within-strand assessment is required for the subskills (see Table 7 for examples).

If subskills within a strand are to be assessed, two possible procedures are employed: (1) a baseline is taken once a day for a five day period for each subskill; (2) at the time of assessment for the terminal behavior or before program implementation, each subskill is probed three times. With this method, the three probes are carried out at Level 5 and no additional levels of testing are employed. The child's performance is recorded as 5 or 0 which indicates either mastery of the skill or concept, or no response or the incorrect response. In both of these instances teaching will begin with the lowest behavior scored at a zero level in the sequence and work up the strand teaching all of the behaviors the child was unable to perform at Level 5 when assessed on baseline; subskills on which the child was competent would be placed on review to maintain them in the child's repertoire. The summary assessment grid for several terminal objectives and subobjectives given in Table 7 illustrates several behavioral objectives assessed in the motor area of development. Behaviors 1A, 2A, 2B, and 2C all represent terminal objectives in each strand assessed at Level 5. Level 5 was the lowest and most frequent assessment level over three assessment trials. The stability index is summarized as Level 5 for teaching purposes. Objectives 3A, 3B, 3B1, 3C, and 3C1 were all assessed at Level 0 for teaching. Objective 4A was

## COMPLETED EXAMPLE OF INFANT CRITERION-REFERENCED ASSESSMENT IN MOTOR DEVELOPMENT

NAME ____________________

D.O.B. ____________________

TEACHER ____________________

DATE ____________________

Criterion Referenced Assessment Guide

Motor Development

*SI - summarized stability index

1. Controlled Eye Movements

| SI | 1 | 2 | 3 |
|---|---|---|---|
| 5 | 5 | 5 | 5 |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

A. Looks at object in hands (P15A)
   (1) eye movements on back (P5)
   (2) looks and holds (P7A)
   (3) looks at hands (P14)

2. Head Control Prone

|  | 1 | 2 | 3 |
|---|---|---|---|
| 5 | 5 | 5 | 5 |
|  |  |  |  |

A. Holds head and chest up 15 seconds prone on elbows (P13)
   (1) holds head up 5 seconds (P6)

|  |  |  |  |
|---|---|---|---|
| 5 | 5 | 5 | 5 |
|  |  |  |  |
|  |  |  |  |

B. Lifts head - prone on elbows
   (1) raises head within 10 seconds (P2)
   (2) raises head within 5 seconds prone on elbows (P8)

|  |  |  |  |
|---|---|---|---|
| 5 | 5 | 5 | 5 |
|  |  |  |  |
|  |  |  |  |

C. Turns head and reaches for toy prone on elbows
   (1) head turning (P3)
   (2) raises head (P8)

3. Head Control Supine

|  | 1 | 2 | 3 |
|---|---|---|---|
| 0 | 0 | 0 | 0 |

A. Holds head up 15 seconds

|  |  |  |  |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |

B. Lifts head within 10 seconds
   (1) lifts head momentarily within 1 minute (P11A)

|  |  |  |  |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |

C. Turns head
   (1) moves head side to side (P4)

4. Rolling

|  | 1 | 2 | 3 |
|---|---|---|---|
| 1 | 1 | 1 | 1 |
| 0 | 0 | 0 | 1 |

A. Rolls back to stomach
   (1) rolls side to stomach

|  |  |  |  |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |

B. Rolls stomach to back (P21)
   (1) rolls side to back (P10B)

5. Sitting

|  | 1 | 2 | 3 |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 5 | 5 | 5 | 5 |

A. Sits with back unsupported on floor and chair (P29)
   (1) head erect

at Level 1, thus 4A1 was tested; Objectives 4B, 4B1, and 5A were assessed at Level 0 and 5A1 at Level 5. From this assessment data the teacher would begin the planning of teaching programs with the parents in the Head Control Supine area as this is the lowest terminal objective in the strands on which the child didn't attain mastery.

In summary, the criterion-referenced procedure indicates to the teacher the what and where to begin instruction for specific objectives and subobjectives. This assessment procedure is then combined with the teaching model using a consistent program format to provide the instructional design for home or school teaching.

### Instructional Program Development

Instructional programs for use by parents at home and teachers in the school are employed from various sources (Anderson, Godson, and Willard, 1976; Fredericks et al, 1976) as well as written by the teachers and staff of the project. The program format results in each one containing the following elements:

(a) behavioral objectives - the terminal objective the child must attain for mastery of the skill or concept and completion of the program;

(b) the sequence of steps appropriate to teach the objective - these are derived from a task analysis of the objective or other sources;

(c) a procedural section which outlines how to implement the direct teaching model in relation to that specific objective;

(d) review and maintenance components which are implemented following criterion achievement to assist the generalization and maintenance of the behavior over time.

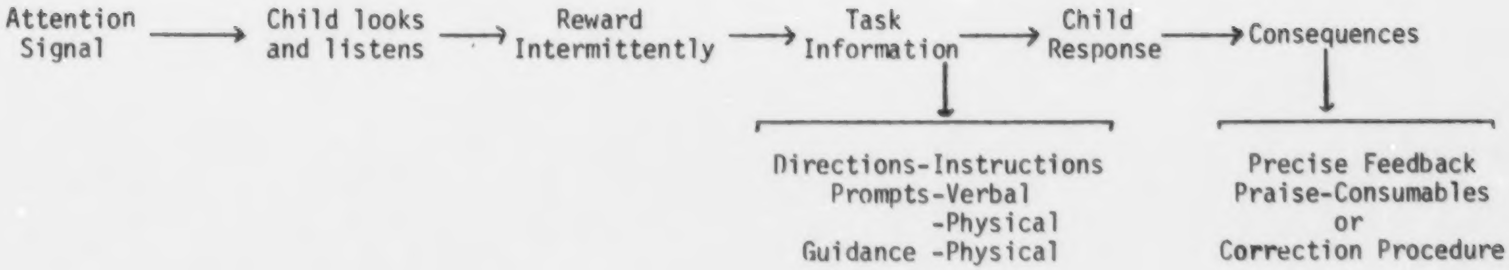
## The Test-Teach Method: Direct Teaching Model

The Direct Teaching Model used within the project and in conjunction with the developmental curriculum and criterion-referenced assessment procedure provides the teaching format for parents and teachers trying to attenuate developmental delays.

The teaching model is derived from a basic behavioral instructional model developed by Engelmann (Becker, Engelmann and Thomas, 1975b). The two components of this model include an attention component and an instruction component as shown in Table 8. Attention signals are continuously used to secure the child's looking and listening and then teaching or task information is provided; if the child responds appropriately rewards and precise feedback follow or if incorrect, correction procedures are provided. Intermittent reinforcement is provided following attention signals in order to build up and maintain persistent attentiveness on the child's part as this has been a particularly critical area of delay. The antecedent events include task information and instructions, prompts, and teacher guidance; the consequent events include rewards, the use of wrong or "no"

## TABLE 8

## COMPONENT MODEL FOR INSTRUCTION


Attention Signal
Child looks and listens
Reward Intermittently
Task Information
Child Response
Consequences
Directions-Instructions
Prompts-Verbal
-Physical
Guidance -Physical
Precise Feedback
Praise-Consumables
or
Correction Procedure

as negative feedback, precise feedback regarding accurate responding, corrective feedback, and correction procedures.

This approach emphasizes the importance of both the antecedent events (prior to the child's response) and the consequent events following the child's response; the functional influence and control of these events over the child's behavior is the key process in the teaching model (Skinner, 1953, 1968). Much research evidence (in particular, Becker, Engelmann and Thomas, 1975b; Zeamann and House, 1963; Martin et al, 1975) has suggested that these antecedent instructions prompts and guidance and consequent events are particularly important to ensure acquisition of new skills and concepts by the developmentally handicapped child.

The Direct Teaching Model employs prompts and physical guidance procedures to assist the child in responding to the learning situation. This procedure is modified from the work of Martin et al. (1975) and his colleagues at the Manitoba Institute on Mental Retardation. The levels of prompting and guidance are the same as those previously described in the assessment procedures with some distinct alterations. Two distinct procedural differences between the assessment procedure and Direct Teaching Model are as follows:

(1) In the teaching model, teaching begins at Level 1 and progresses through to Level 5. Assessment on the other hand begins with Level 5 and progressed down to Level 1. The teaching model uses the inverse order of the

assessment procedure in terms of the introduction of prompts and guidance.

(2) In the assessment model, prompts and guidance are not presented together; however in the Direct Teaching Model the prompts and guidance are employed in a cumulative manner at the lowest levels and gradually faded out as the child progresses.

The prompts and guidance are presented as close as possible after each other or, when appropriate, together. For example, it is not possible to present an instruction and verbal prompt in any other manner than one following the other. However, physical prompts can be provided at the same time as verbal prompts. Also, physical prompts and physical guidance can be presented together, where one hand guides and one hand prompts.

The cumulative nature of verbal and physical (perceptual) prompts and guidance (motor cue) implies that they serve as mediators for the desired response. This cumulative procedure differs from the model presented by Martin et al (1975). Within the Direct Teaching Model, prompts are always presented following a discriminative signal (either attention or task instruction) and faded out in a gradual sequential manner as soon as possible. Table 9 shows the sequence and content of each of the five teaching levels.

As can be seen in Table 9, the guidance and prompting is gradually faded out as the teacher or parent moves up the sequence through the teaching levels. Table 10 presents an

## TABLE 9

### FIVE INSTRUCTIONAL LEVELS OF THE DIRECT TEACHING MODEL

| Teaching Levels | Components |
|---|---|
| Level 1 | 1. Instruction<br>2. Model *<br>3. Verbal prompt<br>4. Physical prompt<br>5. Physical guidance - Level 1 |
| Level 2 | 1. Instruction<br>2. Model *<br>3. Verbal prompt<br>4. Physical prompt<br>5. Physical guidance - Level 2 |
| Level 3 | 1. Instruction<br>2. Model *<br>3. Verbal prompt<br>4. Physical prompt |
| Level 4 | 1. Instruction<br>2. Model *<br>3. Verbal prompt |
| Level 5 | 1. Instruction<br>2. Model * |

* May or may not be included depending upon the terminal behavior in the program.

## TABLE 10

## EXAMPLES OF TEACHING LEVELS AND CONCOMITANT SCORING CATEGORIES

1. Level 2

| TEACHER BEHAVIOR | SCORING CATEGORIES |
|---|---|
| Say eat | Instruction model |
| You say it Danny "eat" | Verbal prompt model |
| (gestures to own mouth while saying this) | Physical prompt |
| Use one finger on child's mouth | Physical Guidance - Level 2 |

In the foregoing example the word eat is scored as a model because the teacher is emitting the sound she wants the child to imitate. If the teacher used both hands to assist in forming the child's mouth to produce the sound, this would have been an example of Level 1 teaching.

2. Level 3

| TEACHER BEHAVIOR | SCORING CATEGORIES |
|---|---|
| Say ball | Instruction model |
| Danny say ball. | Verbal prompt model |
| (points to the child while saying this) | Physical prompt |

Note: "Danny say" is scored as a verbal prompt because it is a verbal directive following the instruction, directing the child to engage in a specified behavior. In this instance the verbal prompt is an expanded instruction because the teacher includes the child's name. The physical prompt is pointing to the child indicating he should respond.

3. Level 4

| TEACHER BEHAVIOR | SCORING CATEGORIES |
|---|---|
| Say eat | Instruction model |
| Say eat | Verbal prompt model |

Note: In this example the verbal prompt is a repetition of the initial instruction.

4. Level 5

| TEACHER BEHAVIOR | SCORING CATEGORIES |
|---|---|
| Say eat | Instruction model |

example of the teaching levels to clarify the specific component sequence for a given trial.

In addition, within a series of several trials at any specific teaching level, the teacher/parent gradually reduces or fades the amount of guidance or prompting such that the transitions on trials between levels, e.g. the last trial of Level 1 to the first trial of Level 2, is no greater change than the transitions between trials within the teaching level. This fading process is very important in easing the transition to lesser amounts of prompting and guidance while at the same time reducing the child's dependence upon the teacher for assistance.

The criterion for shifting from one level to another is three consecutive correct responses at a given teaching level. If the student displays an incorrect response at any level, the teacher immediately drops back to the previous level of instruction and continues teaching at that level until three consecutive correct responses are obtained at that level again. If, however, the child exhibits the behavior immediately after the instruction without the need for prompting and guidance this is recorded by circling the trial and after five consecutive instances the child is moved from that step in the program or from that particular program into the next step of instruction. This procedure allows for skipping rather quickly through the steps of the program if the child does not require prompting and guidance in order to proceed.

### Data Collection Format

Teachers and parents record student performance following each instructional trial. Recordings are made on the Training Session Data Sheet developed by Martin et al (1975) at the Manitoba Institute on Mental Retardation which is presented in Table 11. Child correct responses are recorded by indicating the number of the teaching level. For example, if the child responds correctly at Level 1 instruction, a number 1 is recorded in the appropriate box on the data sheet; similar recording procedures are used for all teaching levels. The first row of Table 11 indicates the typical pattern of recording for a particular behavior. Child incorrect responses are recorded by an X or 0 in the appropriate column for individual trials. This example illustrates criterion shifts up and down which record a child's performance during a teaching session. This recording system is very functional as it allows for ease of recording and gives an ongoing record of child progress through the levels of teaching for programs and steps within programs. Using the criterion for shifting up and down within the five levels, the teacher knows exactly where the child is and what to do next.

The results of our criterion referenced assessment procedure tell us at what level to begin teaching. The parents and teachers then begin the instructional program at this level and gradually increase the level of teaching by the reduction of prompts and guidance until the child is responding spontaneously on his or her

TABLE 11

## MIMR TRAINING SESSION DATA SHEET

**STUDENT:** John Smith

**TRAINING ITEM:** Stacking Blocks

| Date & Sess. No. | Step. No. | TRIALS | Teacher Comments: |
|---|---|---|---|
| 19/12<br>1 | 2 | 1 1 x 1 1 1 2 2 x 1 1 x 1 1 1 2 ② 2 3 x 2 2 2 x 2 2 2 3 3 | |
| | | | |
| | | | |
| | | | |
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| | | | |

**Peculiarities of Prompts/Comments:**

own to the natural cues or signals. The reason for starting at the level of assessment is to ensure the greatest success for the child in a teaching situation.

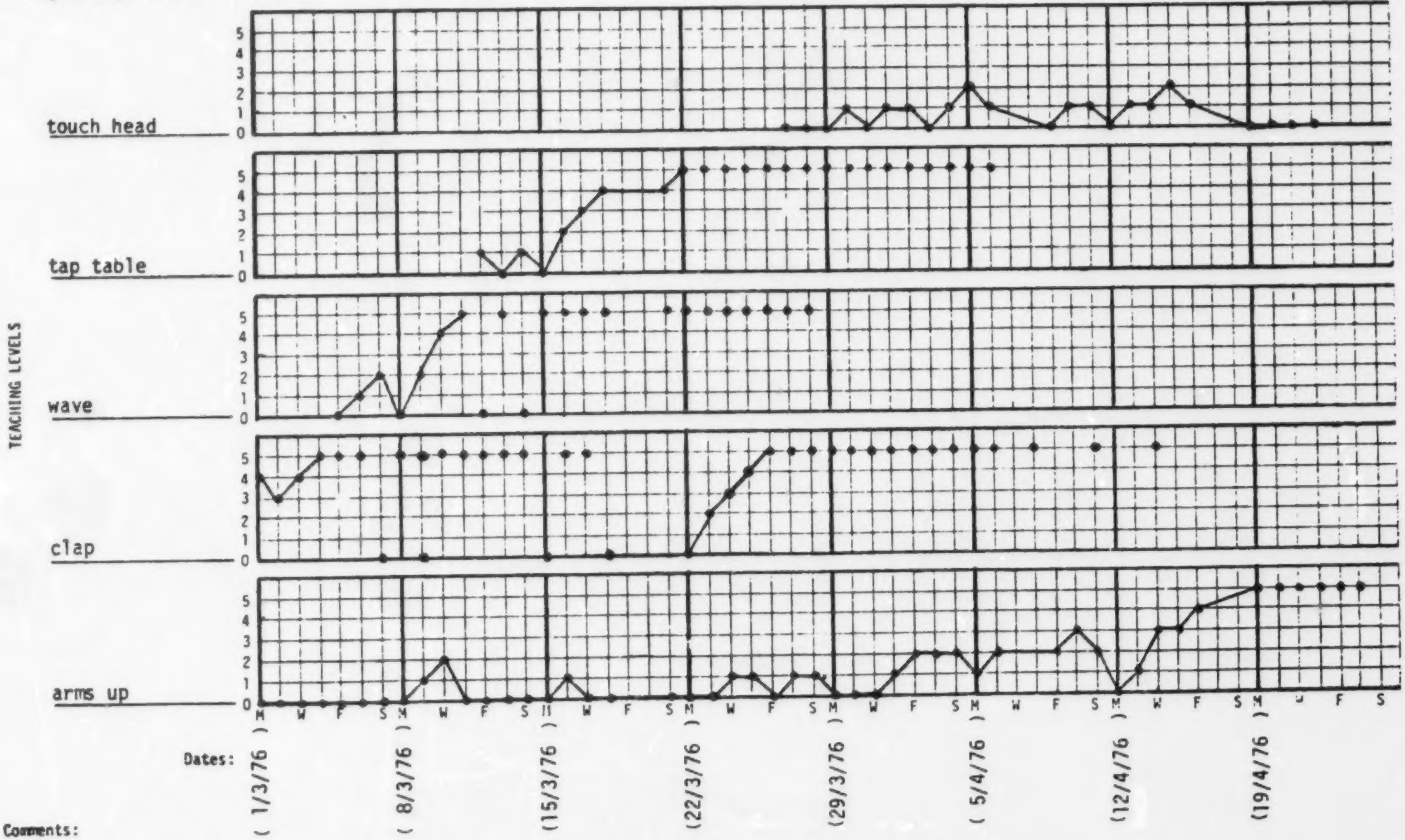
Figure 1 illustrates the graphing format used within the programs. This graph represents the child's progress through each teaching level and for various behaviors in a gross motor imitation program. As can be seen in the graph, days are shown across the bottom and behaviors in the program as successive panels going up the side. As the child's performance reaches criterion at each level it is graphed from the 0 - 5 level with review for five days and maintenance once a week being indicated after learning as unconnected dots following level 5. In this example two actions are taught at once requiring the child to discriminate between them. When the child imitates one reliably, it is placed on review and another action is incorporated. Review, the time generalization procedure, is taken once a day for five consecutive teaching days; if the child is correct 4 of 5 or 5 of 5 trials, the behavior is placed on maintenance. Maintenance, the long term follow-up procedure, is checked once a week for five weeks. As can be seen in the graph, the second behavior, clap hands was not well maintained so it was re-taught after tap table was learned. This graph exemplifies the manner in which one can monitor the children's progress in programs and make helpful changes in program or teaching if a plateau is attained. This format also aided the evaluation of teaching effectiveness.

## TEACHING EXAMPLES IN GROSS MOTOR IMITATION IN THE HOME PROGRAM

**TEACHING SESSION GRAPH**

Teacher(s) Mother GROSS MOTOR IMITATION PROGRAM Student Nathan

Program Step Numbers:



Comments:

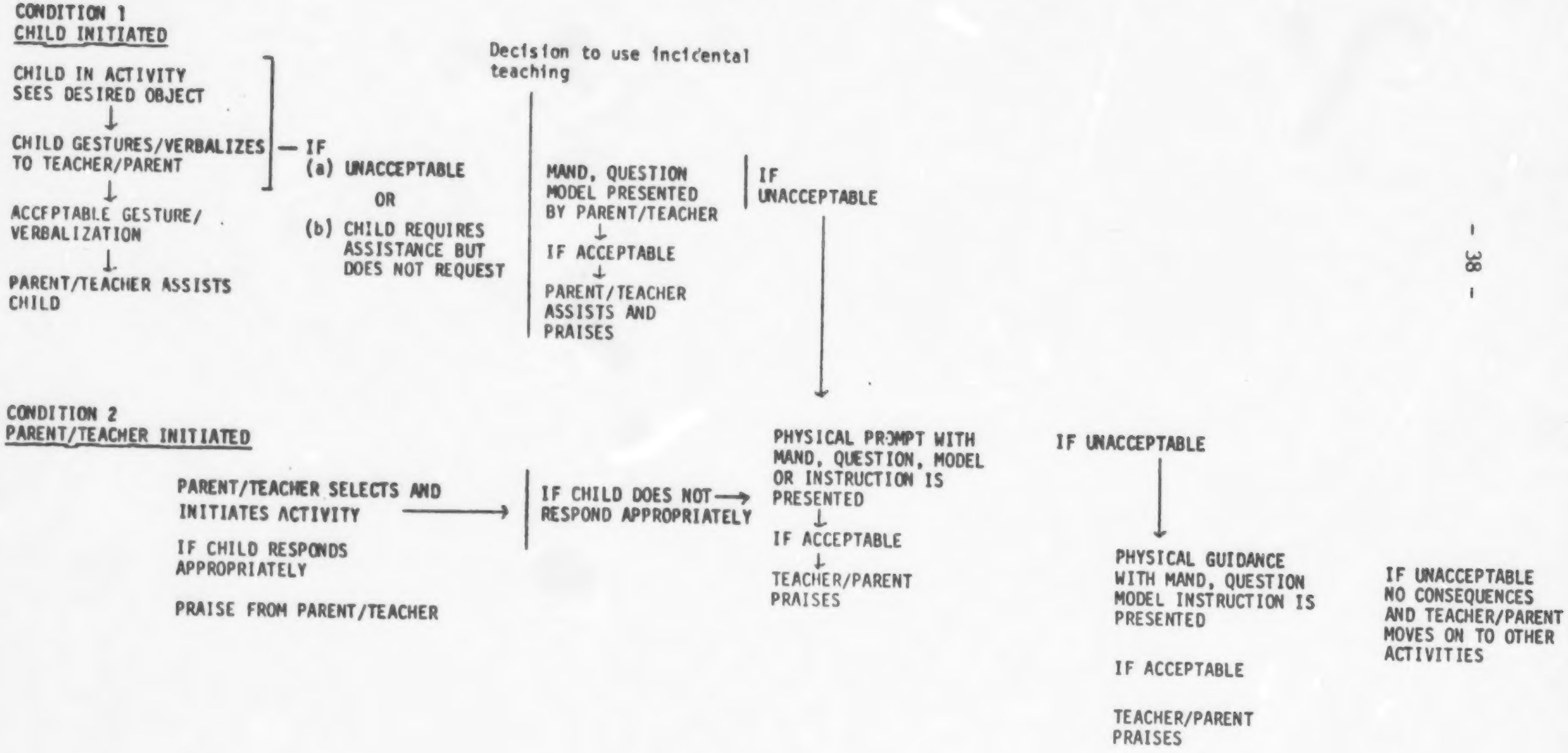
Starting date: March 1, 1976

## The Test-Teach Method: Incidental Teaching Model

An Incidental Teaching Model adapted from Hart and Risley's work (1975) has also been developed. This procedure is designed to transmit information to the child, practise the development or generalization of a skill or concept, or teach new skills or concepts for language and other areas in naturally occurring situations. The procedure is readily employed by parents, teachers, and volunteers in assisting the child to learn to use language more effectively. Modifications to the procedure outlined by Hart and Risley include the development of parent/teacher-initiated situations for incidental teaching as well as the child-initiated situations. Table 12 presents a schematic illustration of both child-initiated and parent/teacher initiated situations. Parent/teacher-initiated situations as well as child-initiated situations are employed because many of our children do not exhibit spontaneous language. This decision-making model includes a series of decisions about which verbal cues and prompts as well as guidance may be used to assist the child in responding. Further explanations of this model with examples will follow. The teaching staff were given in-service training modules for each of the foregoing areas. A major difference in using the incidental teaching model was the lack of data collection by the teachers. The language rating system (Kysela and Hillyard, 1976) was employed to monitor the teachers' use of these procedures and changes in the children which may have occurred.

## TABLE 12

## INCIDENTAL TEACHING DECISION MAKING MODEL


CONDITION 1
CHILD INITIATED
CHILD IN ACTIVITY SEES DESIRED OBJECT
CHILD GESTURES/VERBALIZES TO TEACHER/PARENT
ACCEPTABLE GESTURE/ VERBALIZATION
PARENT/TEACHER ASSISTS CHILD
IF
(a) UNACCEPTABLE
OR
(b) CHILD REQUIRES ASSISTANCE BUT DOES NOT REQUEST
Decision to use incidental teaching
MAND, QUESTION MODEL PRESENTED BY PARENT/TEACHER
IF ACCEPTABLE
PARENT/TEACHER ASSISTS AND PRAISES
IF UNACCEPTABLE
CONDITION 2
PARENT/TEACHER INITIATED
PARENT/TEACHER SELECTS AND INITIATES ACTIVITY
IF CHILD RESPONDS APPROPRIATELY
PRAISE FROM PARENT/TEACHER
IF CHILD DOES NOT RESPOND APPROPRIATELY
PHYSICAL PROMPT WITH MAND, QUESTION, MODEL OR INSTRUCTION IS PRESENTED
IF ACCEPTABLE
TEACHER/PARENT PRAISES
IF UNACCEPTABLE
PHYSICAL GUIDANCE WITH MAND, QUESTION MODEL INSTRUCTION IS PRESENTED
IF ACCEPTABLE
TEACHER/PARENT PRAISES
IF UNACCEPTABLE NO CONSEQUENCES AND TEACHER/PARENT MOVES ON TO OTHER ACTIVITIES

As can be seen in Table 12, this teaching method capitalizes upon naturally-occurring situations to teach children new or more elaborate language skills. If the child doesn't respond, the teacher/parent drops down to the equivalent of Level 3 from the Direct Teaching Model to assist the child in responding. If this action is still ineffective, the teacher would go to the most extensive level of incidental intervention similar to Level 1 of the Direct Teaching Model, using full guidance along with the instructions. Thus, in a matter of seconds the teacher may turn a spontaneous incident into a teaching/learning situation for the child.

## EMPIRICAL CHARACTERISTICS OF THE EARLY EDUCATION PROJECT

The following section will describe the research methods employed in collecting data regarding the evaluation of the Early Education Project. The three sections will include a description of the normative data collection procedures, covering four testing periods, the evaluation of children's progress through teaching programs, which include pre - post measures as well as multiple baseline evaluations of the teaching model's effectiveness, and probes employed during the study to evaluate teacher effectiveness and parent effectiveness, including the use of the Behavior Analysis System (Hillyard, Kysela and Davis, 1976) and the Language Rating System (Kysela and Hillyard, 1976). These descriptions will serve as the basis for the interpretation of the results in the next section of the final report.

### Normative Testing Investigation

In order to obtain information about the handicapped children's progress over the course of the Early Education Project's duration, both normative assessment devices and criterion assessment devices were used to measure the children's growth. In the area of normative testing devices, the Bayley Scales of Infant Development (1969) and the Stanford-Binet Scales of Intelligence were employed to obtain measurements of mental age for the children. These devices were used as they seemed to cover the full age range of the children involved and were sensitive enough to monitor changes in growth that were occurring over the six month intervals of testing. In the area of language development, the Reynell Developmental Language Scales and the Zimmerman Language Inventory were employed. However, because of the lack of sensitivity of the Zimmerman scale to changes over the six month intervals of testing, results are presented primarily from the Reynell Language Scales in terms of monitoring development of both the expressive and receptive (comprehension) language skills with the children.

In terms of testing procedure, standard assessment procedures for these devices were employed for administration to the children. Each child was tested upon entry into the home or school program of the project, and tested subsequently at four to six month intervals over the course of the duration of the project. Thus, for most of the children in the home and school programs, three testings were carried out and for a few children in the school program, a fourth testing was carried out. However, due to examiner differences and the few number of children assessed during the fourth testing, analyses of this testing will not be presented in detail, although material will be presented graphically from this analysis. Thus, data will be presented about mental age changes and language age changes, in terms of both expressive language skills and comprehension or receptive language skills of the children. In addition, a unique computation involving a ratio of the mental age or language age over the child's chronological age will be shown across three testing periods. This ratio provides an index of the child's mental age to chronological age proportions and allows for an observation of increases or decreases in this relationship by observing the value of the ratio over the several testing times. That is, if the ratio is going up, approaching 1 from .50, the child's mental age, relative to his or her chronological age is increasing, which would be interpreted as positive results. Whereas, if the ratio is going down, getting closer to 0 from .50, for example, the ratio would be getting worse, and the child would be falling farther behind his or her chronological development in terms of mental growth. The notion of a cumulative deficit in mental retardation would suggest that a retarded child's abilities should become poorer in relation to their chronological growth as they grow older. Thus, according to this hypothesis about accumulating deficiencies, one would expect these ratios to either be maintained or to reduce over the eighteen month period of the project. Hence, changes in this ratio score will provide an index of growth on the child's part, in terms of mental development or language skills, relative to their chronological growth over the course of the project.

## Mastery of Skills and Knowledge

As a result of the standardized data collection format described previously, extensive data was collected by the teachers on the children's learning of new skills and concepts on until each behavior has been taught to the child. An interpretation of this data, obtained through the multiple baseline design, includes evaluating the effects of introducing the teaching procedures on each of the behaviors. If the teaching procedure is responsible for acquisition of new skills or behaviors by the child, the behaviors observed will show specific changes at that point in time when the teaching procedure is introduced for them. This type of finding will indicate the direct influence of the teaching procedures on the acquisition of new skills and behavior by the child. This procedure was carried out in several instances, to determine the specific effects of the teaching methods and will be reported in the results section.

In summary, both before and after and multiple baseline information regarding children's acquisition of new skills and knowledge will be presented. This data was obtained from the teachers' daily collection of information about the children's progress through programs. In the case of the home project, this data was collected by the parents during their teaching procedures and was validated in part, by teacher probes carried out each week during the teacher home visit.

In the use of the multiple baseline design, we can determine the effects of the teaching procedures by their specific effects on the behavior when they are introduced. In the instance of the before and after material, the children are serving as their during the course of the project. These data provide us with an indication of the children's mastery of these new concepts and skills and have been used in some specific instances to evaluate the direct effects of the teaching methods. In addition, in terms of comparing the child before and after teaching the material in the program, these data also provide us with an indication of the duration of time required for children to learn various skills and concepts.

The first type of data comparison employed will include the comparison of pre - post measures on the children regarding their specific acquisition of skills in the language area, self-help area, and cognitive development. Synopsis of data in these areas will thus provide an indication of the length of time required to teach children these various skills and concepts.

A second type of analysis to be presented involves the use of the multiple baseline design to determine the effectiveness of the teaching procedures in the children's acquisition of new skills and concepts. In utilizing this design, several behaviors are observed prior to initiation of teaching intervention. Following the establishment of this basal information, the teaching procedure is initiated with one of the three or four behaviors. Continued measurements are taken on the other three behaviors, as well as the behavior or skill being taught. As the child learns the first behavior being taught, the teaching procedures are subsequently initiated for the second of the four or five behaviors being observed. This procedure is carried own controls in comparing their performance of new skills and concepts prior to and following the introduction of teaching procedures by the parents or the teachers. These data will enable us to make some generalization about the effects of the training program on the acquisition of these skills and concepts by the children.

## Teaching Effectiveness Probes

A rather unique development from the project has been the utilization of both a behavior analysis system, and a language rating system to determine the effectiveness and adequacy of teacher implementations of the training programs. That is, the Behavior Analysis System (Hillyard et al, 1976) was developed to determine if the teachers were implementing the direct teaching programs correctly. This analysis system was used at home to monitor parents, as well as in the school, to monitor teachers and teacher assistants and the way in which they implemented their instructional programs with the children. Some limited data will be presented from this analysis system, indicating the efficiency and adequacy with which teachers and parents implemented instructional programs. Feedback to both parents and teachers as a result of analyzing video tapes of their teaching activities resulted in modifications to their teaching styles, such that they were more effective and more accurate at implementing programs designed to teach the children. In several instances, subsequent to this feedback procedure to the parents, children exhibited gains in behavior which had previously not occurred. Thus, the behavior analysis system seemed to be useful in indicating methods of increasing the skill and adequacy of the teachers' and parents' use of instructional programs.

The Language Rating System (Kysela and Hillyard, 1976) was developed to determine the activities of teachers and students during incidental teaching times. Since the teachers were not collecting data about children's progress during incidental teaching periods, it was essential to develop a system to monitor this instructional activity. Some limited data will be presented from these rating systems, indicating the adequacy of the teachers' skills in applying incidental teaching. As well, the material from this rating system provided information about the ecological conditions of the classroom, in terms of child language behavior. Feedback to the teachers regarding these language repertoires the children exhibited resulted in the teachers changing their strategies of interaction during incidental teaching, to increase certain types of language skills which the children were using. This data will be elaborated in the results section, indicating the current use of this rating system as well as a number of potential uses of this evaluative system in the future.

Hence, probes with these rating systems allowed the project research personnel to increase the accuracy of parental and teacher effectiveness during instructional programs, as well as provided information about the children's skills and behavior in the instructional environment, in order to assist the teachers in modifying their programs and teaching approaches to attain more suitable objectives.

## ANALYSIS OF RESULTS

Four major segments constitute this results section of the report describing the data obtained during the project; these data provide various perspectives on the children's development during the course of intervention. As the amount of data collected was voluminous, some selectivity was exercised in terms of material presented; however, a representative description of the results is presented in all cases. The segments include a description of the children's learning in terms of their behavioral development and mastery of programs. Then, the normative data from standardized tests is presented. This material is followed by the external evaluation by Richard Schiefelbush; the fourth section presents the per diem costs of the program.

### Behavioral Data of Children's Learning

The basis of the teaching approach employed in the Early Education Project was the data analysis system utilizing the MIMR data acquisition sheet. Both parents at home each day and teachers in school recorded on the data sheets the levels of teaching on which they were involved, trial by trial, for the programs using Direct Teaching. This process was described in the earlier section discussing procedures. As a result of this data collection, information was obtained regarding trials to criterion, total errors to criterion and the number of teaching trials at each of the levels of guidance. Baseline data was obtained for most of the programs, including parent training in the home program, which provide the basis for assessment of the parent's progress as teachers and the children's progress as learners. In order to determine the reliability of the parent's data in the home program, the home teachers probed the child's level of responding for each program being taught; this probe was used each week to measure changes and reliability. These types of data will be presented as evidence of children's learning during the course of the project. Generally speaking, assessment data will not be depicted unless it was collected through the baseline procedure as the assessments indicated which programs to begin teaching.

The instructional process involved teaching programs to the children in each of several areas. The programs themselves were often broken down into steps. Data will be presented for progress through programs and often progress through steps in programs. In each instance this will be clarified in the presentation.
Data will often be presented for a cluster of skills, behaviors, or concepts and sometimes collapsed across several children; again, in each instance, these procedures will be fully described. The standard criterion for completion of a program was three consecutive correct trials at level 5 in the direct teaching programs (five consecutive correct for the first third of the data). However, in the home program, sometimes the parents would continue teaching at level 5 until the teacher made a home visit so that occasionally a child was continued in a program slightly beyond this criterion level.

Review trials were attempted for five consecutive teaching days with an eighty percent or better accuracy level required in order to begin maintenance. Maintenance was assessed for five consecutive weeks, once per week, with a criterion of eighty percent or higher correct trials required in order to terminate the maintenance checks.

The children's progress through parent training and teaching programs will now be presented for the home and school programs with respect to objectives learned and programs completed.

## Home Teaching Program

The general procedures of the Test-Teach Model as described previously for assessment, direct teaching, incidental teaching, program writing, and data collection were employed in the parent-training home-based early intervention project. At the outset of the project, one staff member was trained as the home teacher covering the ten units of the staff development sequence. The home program, like the Portage Project (Shearer et al, 1972) employed the family as the primary source of interventions for the handicapped child. As Bronfenbrenner (1974) points out, ". . . the involvement of the parents as partners in the enterprise provides an ongoing system which can reinforce the effects of the program while it's in operation, and help to sustain them after the program ends ".

The staff development units equipped the home teacher with the basic concepts and skills of behavior modification, the Test-Teach Method for assessment and direct teaching, the program development format, data collection skills, and a three-step parent training program to develop the families as a resource to their infants. The home teacher made weekly home visits to train the mothers and families, assess the child, initiate teaching programs with families, and probe the children to insure their gains were accurately measured by the families. The sequence included initial assessment at home followed by identification of the behavioral objectives in the developmental curriculum on which to begin teaching. Programs were then either taken from the library or constructed to use with the parents to teach their children the skills or knowledge. However, the families first went through the three-step parent-training program to learn the methods of teaching and monitoring learning.

The first step is an explanation of the teaching format and the beginning of teaching at home. The parents are familiarized with how programs are established for specific behavioral objectives within each developmental area and given a brief overview of the "teaching procedure" used to move through the progressive steps in a program. Following this parents are given a behavioral objective assessed at a 5 level (this is a behavior or task the child does without prompts or assistance) and a procedure for maintenance. This procedure gives them a week of practice in establishing a behavior under parental instruction, plus time to practice teaching at a level 5 until they are confident before proceeding to the more complex teaching required at lower levels. In this way, a method to maintain and generalize newly learned behaviors is provided to the parents from the outset.

In Figure 2, examples are presented for two childrens' performances at Step 1 of the Parent Training Program over a one-week period(shown along the horizontal axis across the bottom). Both children maintained a consistent level of performance at a level 5 (shown along the vertical axis, up the side). This figure represents one behavior or task performed in 3 different settings shown in the three panels (the child will follow a moving object with their eyes and head in 180° motion).

The second step in the parent training program requires the parents to implement a sequenced teaching program for a behavioral objective that has been assessed at a level less than 5 but greater than 1. This step gives concentrated practice at teaching using physical and verbal prompts (levels 3 and 4). This step introduces parents to the criteria or procedures used to move the child through the program by gradually reducing the amount of prompting. The parents begin to use the data recording procedures at this stage. Once the behavioral objective is attained at a criterion of level 5, the parent would put the program on maintenance as in the first step of the parent training program.

The first example in Figure 3 on the lower left side illustrates the progress of a 14 month old child through a put-in program assessed at level 3 (he required a physical prompt or gesture to complete the task). Teaching was started at this level and prompts systematically and gradually reduced until the child performed the task on verbal instructions.

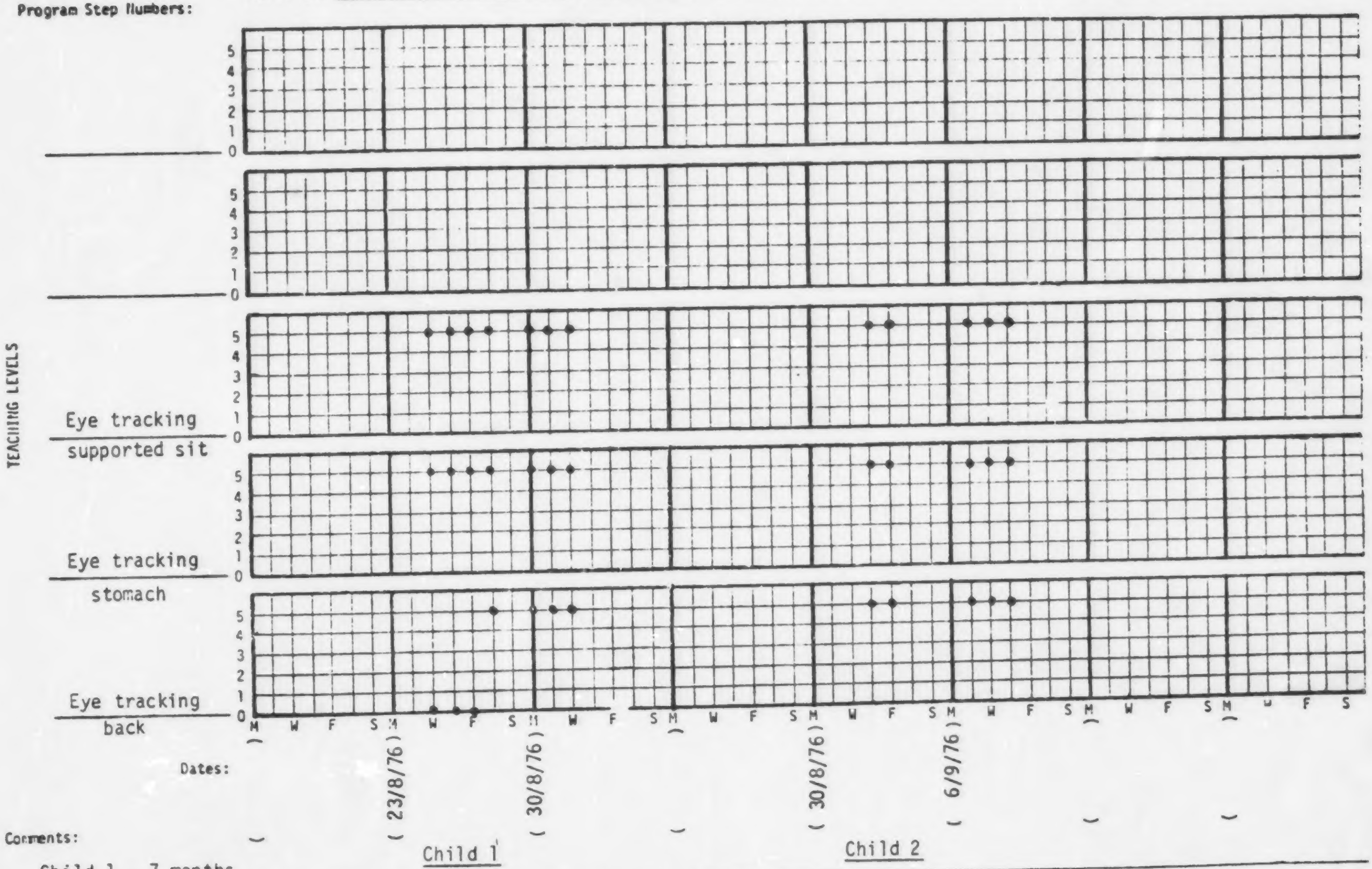
## FIGURE 2

### PARENTAL MAINTENANCE OF BEHAVIOR AT A 5 LEVEL OF TEACHING

**TEACHING SESSION GRAPH**

Teacher(s) PARENT TRAINING PROGRAM - STEP I Student

**Program Step Numbers:**



Comments:

Child 1 - 7 months

Child 2 - 5 months

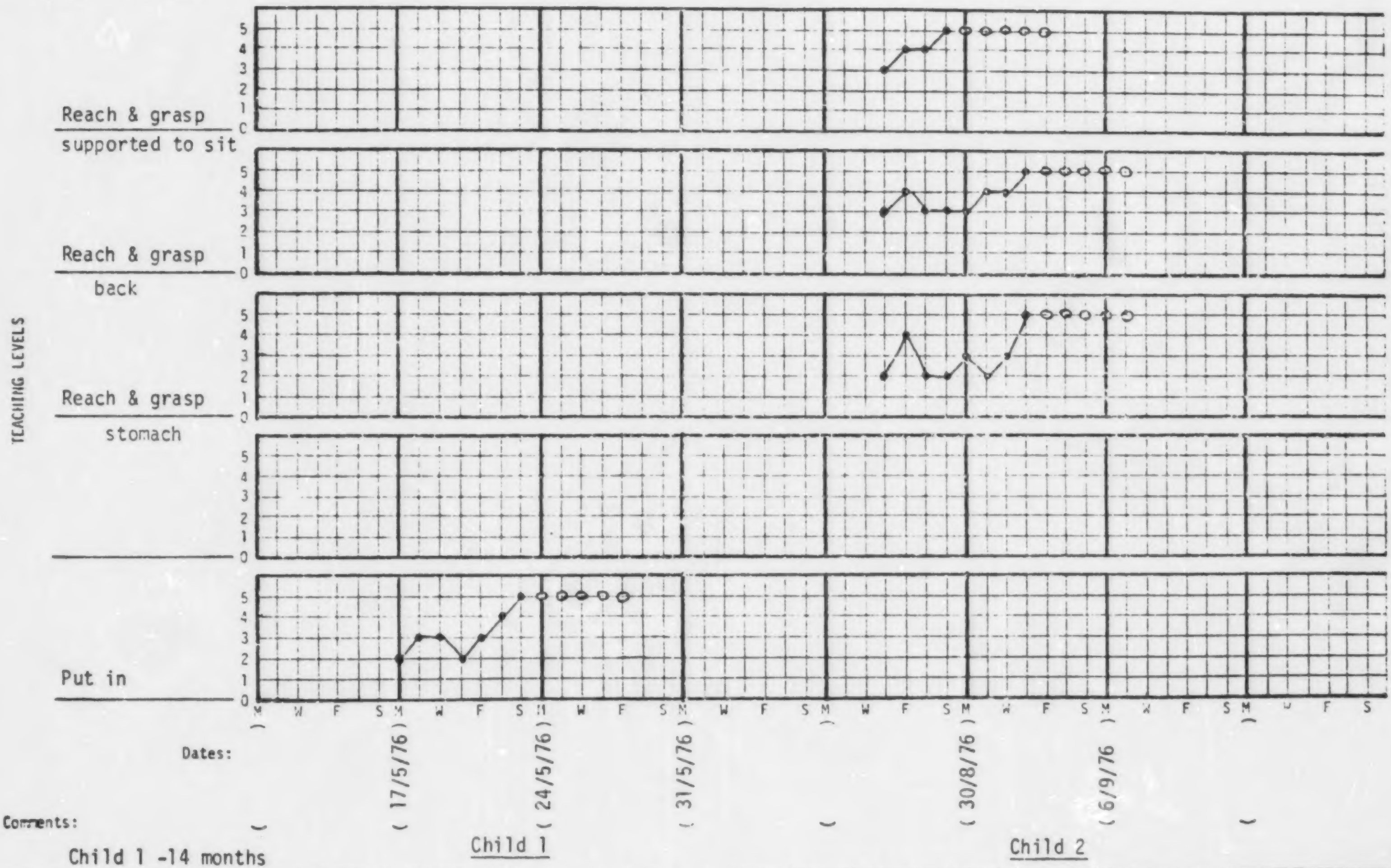
# FIGURE 3

PARENTAL TEACHING FROM LEVEL 3 TO LEVEL 5 IN THE TRAINING PROGRAM

**TEACHING SESSION GRAPH**

Teacher(s) PARENT TRAINING PROGRAM - STEP II Student

Program Step Numbers:



Comments:

Child 1 -14 months

Child 2 - 7 months

The second example in Figure 3 in the upper right section illustrates the progress of a 7 month old child through a reach and grasp program assessed at level 3 in three different positions. Teaching continued from this level of the physical and verbal prompts until the child took the object within 5 seconds of its presentation to him. In both of these examples, the parents were able to move the children through the steps in the program to mastery within an eight-day period.

The last step involves the parents implementing a sequenced teaching program for a behavioral objective assessed at level 0 or level 1 (the child required maximum physical guidance, i.e., had to be put through the task or didn't respond at all). After supervision and practice in using the teaching procedures at level 2 and level 1 (minimal physical guidance with 1 finger and maximum physical guidance with hands on, respectively) parents were able to implement a program to teach any behavioral objective, move their child through it using the teaching model, maintain the skill or concept on review when it is mastered, and record their results on the MIMR data sheet.

Figure 4 presents an example of a child's progress through one of the language programs. The behavior target includes the child imitating either motor actions or sounds within 5 seconds of an instruction and modelled example by the parent. The child learned the actions very quickly but the sounds required more time. However, after several weeks, sounds were acquired as well and the child went on to the next program in the sequence (sounds and words).

## FIGURE 4

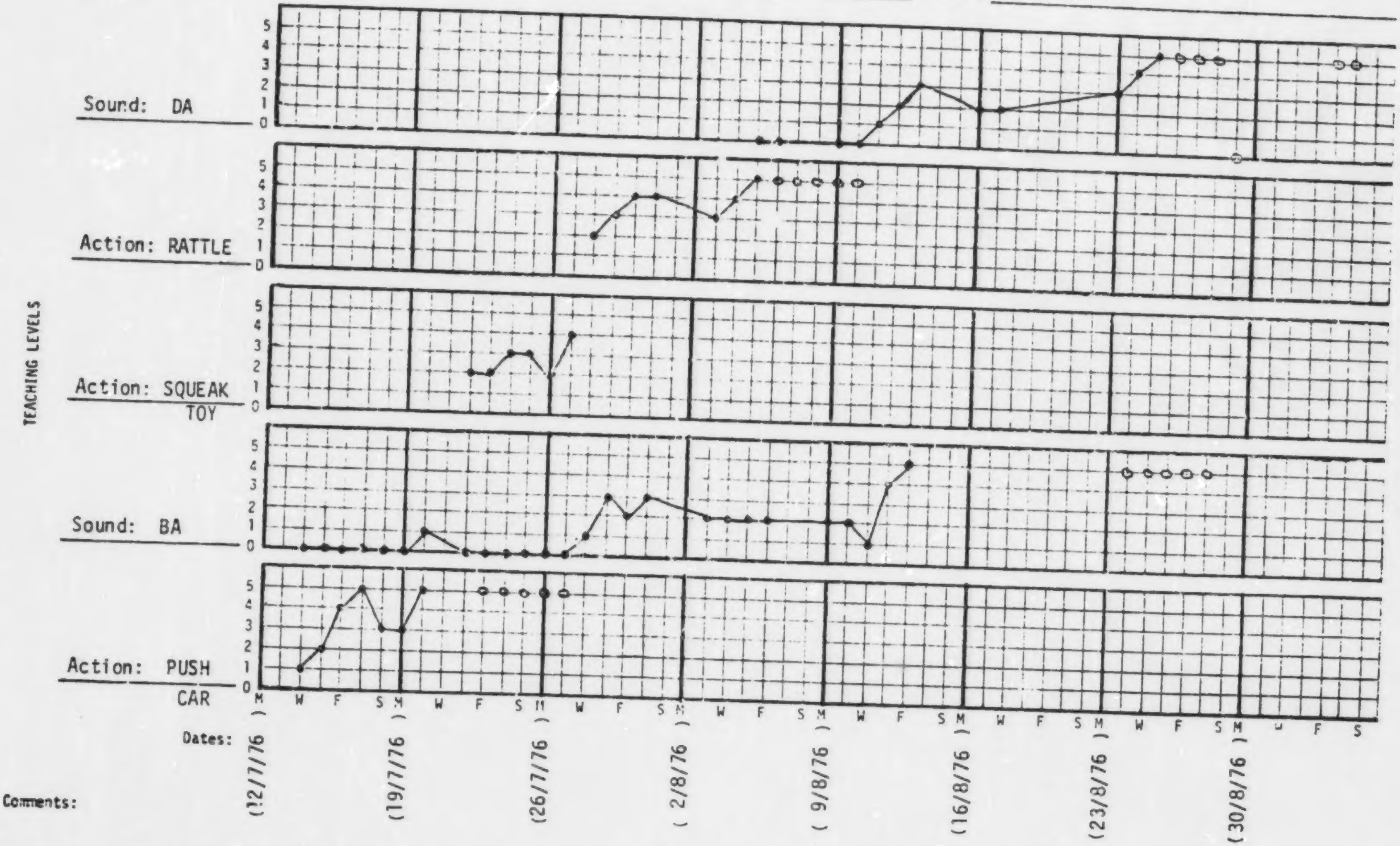
PARENT TEACHING FROM LEVELS 1 THROUGH 5 FOR THE ACTION AND SOUND PROGRAM

**TEACHING SESSION GRAPH**

Program Step Numbers:

Teacher(s) PARENT TRAINING PROGRAM - STEP III

Student 16 Months



Comments:

To teach parents the procedural implementation of a program at the 5 levels of intervention the home teacher uses (a) modelling by the home teacher; (b) behavioral rehearsal by the parents; and (c) video tape replay with feedback regarding the parent's mastery of the skills. Following the last step of the parent training program the home teacher visits the family on a weekly or bi-weekly basis. The home teacher may assist the parents in selecting new behavioral objectives which are appropriate to the child's level of development. She would also guide them in improving their teaching procedures and overcoming problems which arise in teaching or with the programs themselves. In all, 15 of the 22 families have been trained in this manner, with each case attaining success on these skills although the duration of training varied across the families to a certain degree. No families dropped out or terminated their involvement with the home teacher, although frustrations did occur. Typically each step of the training program was completed within 1 to 2 weeks of its initiation.

To date, specific validation procedures of the three-step parent training program have not been conducted, although this process has been proposed as a follow-up of the Early Education Project. However, some inferences regarding its validity are feasible from the facts that all _15_ families completed teaching programs similar to those depicted in Figures 2, 3, and 4 supporting the general effectiveness of the procedures. Secondly, with some selected families, a behavioral analysis was conducted assessing the parent's procedural reliability implementing programs with the direct teaching model (Hillyard et al, 1976). In this instance, the parent's skills significantly improved and the children's subsequent learning was increased. This method (Behavior Analysis System) thus holds promise as a very useful means of validating a sequence of training steps such as those employed in the Early Education Project.

As with any program, many ups and downs were encountered in the implementation of the home teaching program such as illness or the need to adjust to a new teaching procedure. Typical educational or program implementation problems were reflected in the fixation of a child's progress at one teaching level or one step in a multi-step program. These problems were investigated with the Behavior Analysis System to analyze parent implementation of the teaching model; in addition, a program component analysis was done employing a program evaluation decision making model similar to that described by Baine (1977). This model allows for a check of program components such as the size of steps, standards of criteria, or conditions of performance. Following these analyses, problems of parent teaching or program development are isolated, altered, and re-evaluated to determine effectiveness of the early intervention. This process of evaluation, analysis, alteration, re-evaluation, and monitoring was continued until the child's developmental progress through the program resumed.

Following completion of the parent training program the parents continued teaching their children skills and knowledge in language development, cognitive skills, self-help skills, and motor development. The children's progress through programs in each of these areas will now be presented.

### Language Development

Communication, of course, constitutes one of the fundamental areas of development for the young child and thus was one of our major foci for parental teaching. The language curriculum employed with the home program contains both expressive language skills and receptive language competencies. In addition to the objectives in Appendix A, Table 13 provides a list of the general objectives in each of these two areas. As can be seen in these objectives, some basic language skills of a functional nature were being taught. Several other objectives and programs were also developed for individual children from the test, but these programs were taught to at least 4 children and thus are valid to that extent.

The language programs were developed initially from the work of Guess, Sailor, and Baer (1976), Striefel (1974), and Bricker and Bricker (1970), each of whom developed imitative and functional language skills for moderately to severely handicapped children. In addition, specific modifications to the imitation sequence followed from the work of Kent (1976) and Stremel-Campbell, Cantrell, and Halle (1976); material from their efforts suggested a drastic reduction in the amount of motor imitation training, the concurrent teaching of actions and sounds, and the use of manual signs as additional prompts to assist in the acquisition of imitation skills. Subsequent to these program modifications, the research of the

## TABLE 13

## CATEGORIES OF OBJECTIVES IN LANGUAGE DEVELOPMENT FROM THE HOME PROGRAM AND THE BEHAVIOR DEFINITIONS

Expressive Language

| | |
|---|---|
| Attention: | child will look at teacher's (T) face when given the attention signal "____, look here." or "Look at me _____" within 5 seconds of instruction. |
| Motor Imitation: | child will imitate T model of Motor action with 5 seconds of model and instruction "Do this." |
| Action Imitation: | same as Motor Imitation. |
| Sound Imitation: | child will imitate T model of sound within 5 seconds of model and instruction "Do this." |
| Word Imitation: | child will imitate T model of a word within 5 seconds of model "Say _______". |
| Labelling: | child achieves 80% or more correct in session of 32 trials or 12 correct in a row when asked "What's that?" and presented with one of 16 objects. |

Receptive Language

| | |
|---|---|
| Responds to Name: | child will indicate by a change in body movement, eye movement, or motion that he recognizes his own name. |
| One-concept Instructions: | child will respond appropriately to an instruction such as "Give" or "Bye, Bye". |
| Object Identification: | child will point at a normal object within 5 seconds of instruction "show _______" in the presence of distractor items. |

teaching staff (McDonald, 1977) indicated that imitation training was no more rapid with signs or other prompts, for 1-word imitation, than simply using the instruction to imitate with the model and showing the child the object. Thus, an efficient sequence of prelinguistic and early language training (expressive use) objectives and programs was validated and employed with several families.

This "streamlined" sequence begins with attention training and is followed by action and sound imitation, sound and word imitation and finally imitation of _16_ words. Following the attainment of these criteria, the child begins the first of _60_ steps in the Guess, Sailor, and Baer (1976) functional language program (see Appendix A, language objectives). The receptive language skills taught which are summarized include initial responding to one's name, responding to one concept instructions or commands such as "want up", "give","bye-bye", and finally single word object identification such as "show ball", "show box", with one or more distractors present.

Examples of two children's progress through the imitation sequence are presented in Figures 5 and 6. This data exemplifies the graphs used by the teacher and parent to monitor in each area of teaching the child's progress. The behavior target for this program, specifically, is that the child will imitate either the parent's model for a gross motor action within _5_ seconds of the instruction "Do this!" with the concurrent appropriate model of the action by the parent _or_ imitate a sound within _5_ seconds of the

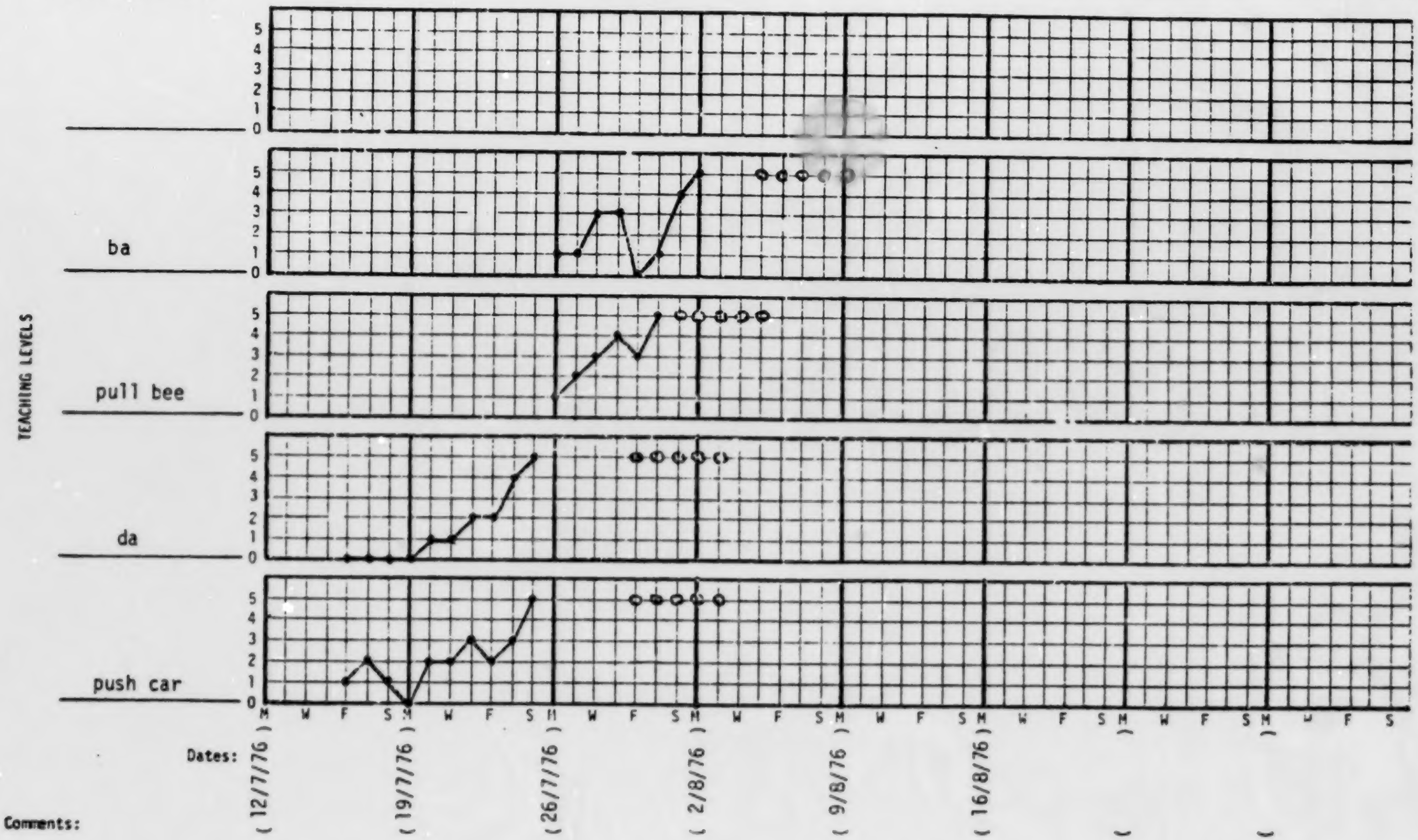
## FIGURE 5

AN INFANT'S PROGRESS THROUGH THE ACTIONS/SOUNDS IMITATION PROGRAM

**TEACHING SESSION GRAPH**

Teacher(s) LANGUAGE-STEP 1 - ACTIONS AND SOUNDS Student 18 months

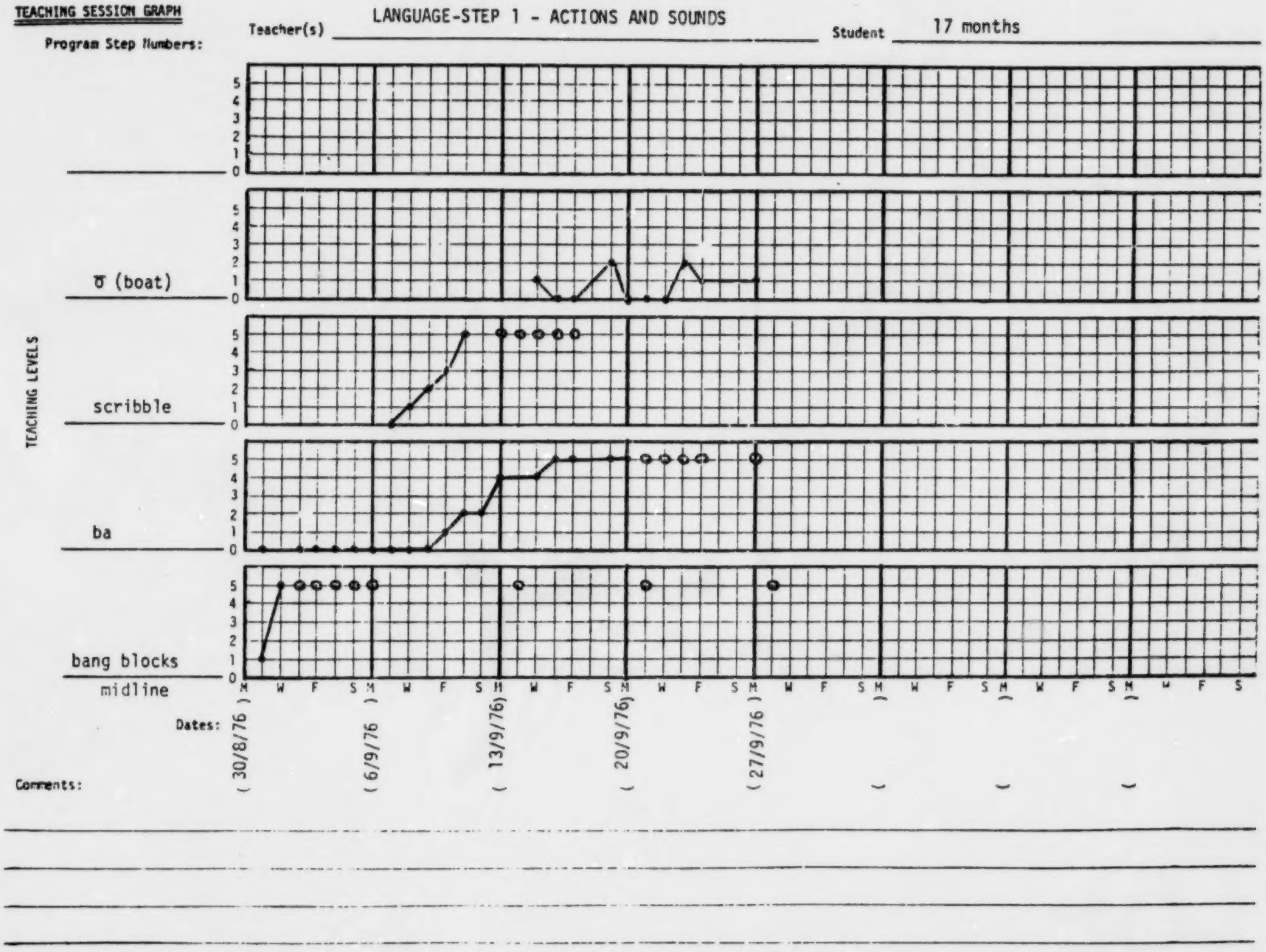
Program Step Numbers:



Comments:

## FIGURE 6

INFANT'S PROGRESS THROUGH THE ACTIONS/SOUNDS IMITATION PROGRAM



instruction, "say (sound)". The responses are taught in a random sequence for the action or sound to increase the child's discrimination and reduce the number of incorrect responding patterns.

Figure 5 presents data for a program in which the child learned the first action and the first sound quickly and at a steady rate. He was then started on a second pair which was again learned quickly and steadily. At this point he advanced to the next program in the sequence - sounds and words.

Figure 6 presents a child's progression in the same program; he took longer to learn the sounds than the motor actions as can be seen for both "ba" and "ō". This pattern is more typical of children's progress in these programs. This infant has since learned the second sound as well and advanced to the sounds/words imitation sequence.

The infant's progress through all of these seven program areas is summarized in Table 14. There were 22 infants involved in training programs for language development with an average age of 14.5 months when they started the program (the standard deviation for this average is 8.8). Thus, although the early children were older, most of the later children in the program were quite young; this range is the reason for the fairly high standard deviation. The data on various children in the project in these language programs first of all indicates the extensive number of skills and linguistic concepts the children could learn at such young ages.

In the expressive language area, for the two children requiring attention training, this goal was achieved very rapidly in 21 trials.

## TABLE 14

### SUMMARY OF CHILDREN'S PROGRESS IN THE EXPRESSIVE AND RECEPTIVE LANGUAGE PROGRAMS

| Expressive Language | N | Mean Baseline | Behaviors | Trials to Criterion | Standard Deviation | Mean Total Errors | Mean Days to Criterion |
|---|---|---|---|---|---|---|---|
| Attention Program | 2 | 75% | - | 21.0 | 15.6 | - | - |
| Motor Imitation | 5 | - | 42 | 64.0 | 80.7 | 6.5 | 10.5 |
| Action | 10 | - | 23 | 85.8 | 70.0 | 14.3 | 10.0 |
| and Imitation | | | | | | | |
| Sound | 10 | - | 25 | 64.5 | 51.8 | 25.6 | 13.3 |
| Word Imitation | 5 | - | 13 | 95.1 | 196.3 | 61.9 | 20.5 |
| Labelling | - | - | - | - | - | - | - |
| Receptive Language | N | Mean Baseline | Behaviors | TTC | SD | TE | DTC |
| Responds to Name | 6 | - | 6 | 139.0 | 119.0 | 24.0 | 20.8 |
| One Concept Instructions | 8 | - | 17 | 101.1 | 87.1 | 22.8 | 17.0 |
| Object Identification | 3 | - | 33 | 46.2 | 72.5 | 7.9 | 10.9 |

The early motor imitation programs and action-imitation programs each required *10* teaching days including *63* and *80* trials to criterion. Reliable sound imitation was established for *10* children after only *13* days of training on the average of *69.4* teaching trials. In each of these programs, it is notable that few errors occurred during the teaching process (averages of *6.5*, *14.3*, and *25.6* respectively) which indicates the positive nature of the teaching process. Finally, word imitation was established reliably after only *20.5* days of teaching in *136.8* teaching trials. This result indicates the definite learning capacity of these children for imitative responding vocally at a very early age (less than two years of age on the average).

With respect to the receptive language skills, six children (average age of 10.5 months) learned to respond to their own names in *20.8* teaching days over an average of *140* teaching trials. The *8* children taught to respond to one-concept instructions did so in *17.0* days across *110* trials. Three of the children learned 1-word receptive comprehension for object identification in *10* days with only *56.2* teaching trials and *8.0* errors on the average. This data points out the remarkable capacity of these young children to learn from instructional programs (see Appendix B for examples) with relatively few errors and requiring comparatively few teaching trials. Although several other programs were taught in the language area to some of the children, insufficient numbers of children ($<3$) precluded presenting their data at this time.

## Cognitive Development

As with pre-linguistic and communication skills, cognitive development provided a second major focus of the home program early intervention process. After initial assessment of the infant with the developmental curriculum and the completion of parent training, the teacher and parent would develop appropriate programs in the area for the child. The parents were teaching their children tasks which ranged in complexity from visual and auditory tracking, reaching, grasping and mouthing to motoric operations with several types of material such as push, pull, open, putting in, and taking out. The complete sequence is presented in the developmental curriculum in Appendix A. Table 15 lists and defines the areas reviewed and summarized from this area of home teaching.

The objectives in this series were developed from several sources. The Portage Guide (Shearer et al, 1972) provided the initial listing of objectives; however, these series were modified, as was described previously, into series of strands with terminal objectives and enabling objectives in each area. The visual and auditory awareness skills and prehension skills have been emphasized by many researchers in early child development (Bayley, 1933; Cattell, 1947; Piaget, 1936) as being important components of early cognitive development. The object permanence sequence included material related to memory skills and early conceptualization by the child of events in their environment. This sequence evolved from the work of Uzgiris and Hunt (1975) in their development of methods of

## TABLE 15

## CATEGORIES OF OBJECTIVES IN COGNITIVE DEVELOPMENT FROM THE HOME PROGRAM AND THE BEHAVIORAL DEFINITIONS

Visual Awareness:

Eye Tracking - child tracks an object by turning head.

Auditory Awareness:

Sound Localization - child turns eyes and head in the direction of the sound.

Prehension Skills:
(Five Motor Coordination)

Reach - child will reach for a bright colored object when it's in front of him.

Reach, grasp, and mouth - child will reach, grasp and put object in his mouth or inspect it visually or auditorily.

Object Permanence:

Find hidden object - child will search for an object or a person's face when hidden from view for several seconds

Operations:

Put in, Put on - child will place an object in or on a specified receptacle or area.

Operations - child will respond correctly to one of eight different commands.

Operations with Distractors - same as operations with the addition of distracting additional items.

measurement of this concept elaborated by Piaget (1936). The sequences involved in operations providing the transition to more complex interactions with the environment by the child include differential responding to simple language cues, e.g., "put it on" and the combined skill sequences of carrying on the five motor actions. These objectives thus constituted most of the early sequences parents were teaching their children. Appendix B contains several examples of programs developed to teach these areas.

The examples given earlier regarding parent training exemplify children's progress through some of these programs. In addition, Figure 7 presents a child's progress through several steps of the Take Out and Put In programs. The behavior targets included the child being able to take out or put an object in a 3 inch (in diameter) container when instructed. The steps in each program involved gradually decreasing the diameter of the container resulting in increased dexterity and attentiveness. The child completed the steps in the program at a consistent rate until the last step. The difficulty at this point consisted of missing the smallest container, but he mastered this step as well after two weeks of teaching. The maintenance of the skill was tested by the five review probes shown at the end of the learning/teaching graph. During revisions of our programs in order to teach operations and concepts generalizable to the natural environment, we changed from teaching single tasks to the use of multiple tasks and operations (Becker, Engelmann, and Thomas, 1975b). These strands are described in greater detail in the classroom section in which they were more extensively

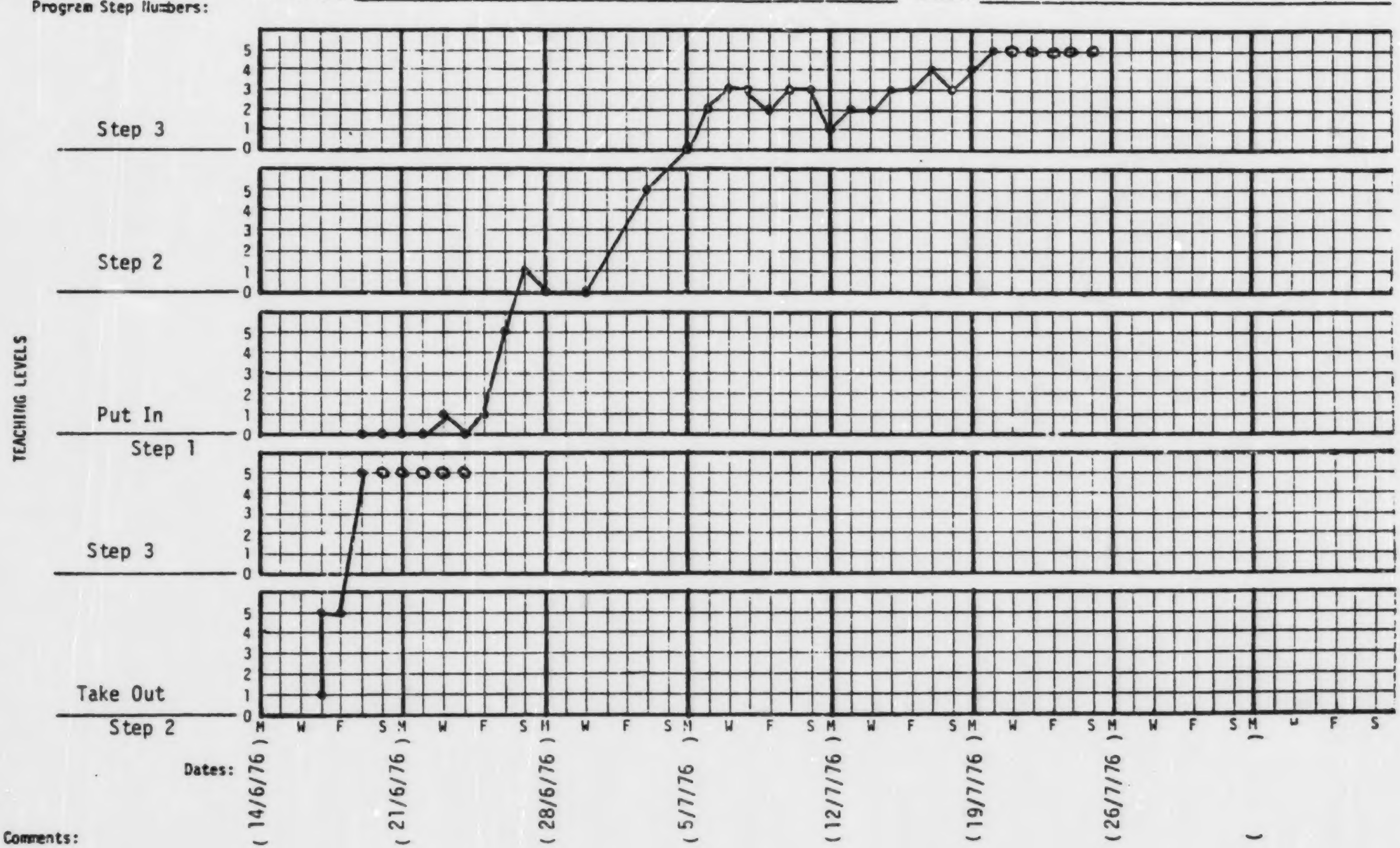
## FIGURE 7

INFANT'S PROGRESS THROUGH THE FIRST TWO STEPS IN THE MOTORIC OPERATIONS PROGRAM

**TEACHING SESSION GRAPH**

Teacher(s) Cognition - (1) Take Out
(2) Put In

Student 17 months



Comments:

employed.

As a result of the data collection process employed with the Direct Teaching procedures, extensive information regarding the children's progress through cognitive programs and steps within programs was available. Table 16 summarizes most of the relevant information abstracted from the parental use of the MIMR data sheets and graphing procedures. Several important points are clear from this data. In all but one instance (i.e., visual awareness) the parents were able to teach their infants these skills and concepts on an average of 13 days or lower. The average days to reach criterion again indicates the rapid pace with which the children learned these new skills and behaviors. Secondly, the relatively low level of the mean errors to criterion, even when considerable trials were required to reach criterion, indicates the effectiveness of the use of the prompts and guidance of the Direct Teaching Method in maintaining a successful learning environment for the infants. A third issue presented is the rather high degree of retention of the skills/concepts as demonstrated by the 84.3% and above mean percent correct on review; these data indicate the stability over time the infants exhibited in retaining these newly acquired skills.

A final point in this area should be emphasized at this time; these data indicate the clear premise that children between two and sixteen months of age with moderate/severe handicaps are quite capable of acquiring and retaining complex cognitive skills and concepts at a very rapid rate requiring typically a rather limited

## TABLE 16

## SUMMARY OF CHILDREN'S PROGRESS THROUGH COGNITIVE PROGRAMS

| Objective | N | Mean Baseline | Total Behavior Targets | Mean Trials to Criterion | Standard Deviation | Mean Total Errors | Mean Days to Criterion | Mean % Correct Review |
|---|---|---|---|---|---|---|---|---|
| Visual Awareness | | | | | | | | |
| Eye Tracking | 1 | - | 1 | 196 | - | 70 | 29 | - |
| Auditory Awareness | | | | | | | | |
| Sound Localization | 2 | - | 3 | 76.6 | 33.3 | 14.6 | 10.3 | 100 |
| Prehension Skills | | | | | | | | |
| Reach | 1 | - | 1 | 29 | - | 2 | 2 | 100 |
| Reach and Grasp | 9 | - | 24 | 52.8 | 26.5 | 14.7 | 6.5 | 90.6 |
| Object Permanence | | | | | | | | |
| Find Hidden Objects | 8 | - | 16 | 38.2 | 61.4 | 7.3 | 6.4 | 84.3 |
| Operations | | | | | | | | |
| Pincer Grasp | 2 | - | 14 | 39.6 | 27.1 | 2.8 | 7.1 | - |
| Put In/Put On | 4 | - | 26 | 76.0 | 88.1 | 10.0 | 6.8 | 95.0 |
| Operations | 12 | - | 46 | 114.8 | 110.0 | 22.2 | 13.5 | 92.9 |
| Operations with Distractors | 4 | - | 15 | 48.8 | 46.0 | 9.3 | 9.5 | 86.8 |

amount of specific parental intervention in the form of direct teaching.

### Motor Skills Development

The third major area of teaching programs in the home-based aspect of the project involved teaching and assisting the infant in attaining motor skills such as crawling, sitting and walking. Again, following initial assessment by the home teacher and completion of parent training, the teacher and parents would begin a teaching program in the identified area of motor development requiring attention. The developmental curriculum contained sequentially arranged strands (from simple to complex skills) of terminal motor skills and their enabling sub-skills from controlled eye movements and head control through to walking, running, and jumping (see Appendix A for a complete listing of this curriculum). Table 17 presents the categories in motor development most frequently taught by the parents at home.

As can be seen in this table, motor development was considered in terms of three components - posture appropriate to the behavior (e.g., sitting), the child's skill in attainment of that posture (from various positions as well), and the locomotion aspect (if appropriate) of the skill, thus ensuring that the children not only acquire the skills but do so with appropriate posture. Some of the strands contained terminal teaching objectives for all three components such as crawling and walking. Thus, when teaching a child to walk, it was decided that a desirable aspect of this skill included appropriate posture and skill at assuming this posture.

## TABLE 17

## TEACHING OBJECTIVES IN MOTOR SKILLS DEVELOPMENT

### Sit

Sitting with back unsupported on floor or chair.

Assumption of sitting from various positions.

### Crawling

Posture - child balances on hands and knees.

Assumption - child will assume the above posture from various positions

Locomotion - child will crawl while maintaining adequate posture.

### Walking

Posture - child will stand unsupported for 30 seconds

Assumption - child will assume stand from various positions

Locomotion - child will walk various distances while maintaining adequate posture.

Some skills however, did not contain the motion components.

These objectives and sequences of strands were employed as a result of reviewing and initially using the Portage Guide (Shearer et al, 1972) in an attempt to establish functional objectives for the child's motor skill development and determine the child's competency relative to those objectives. Developmental milestones (Bayley, 1933; Cattell, 1947), task analysis sequences already employed with moderately and severely handicapped children (Fredericks et al, 1976), a task analysis model for logically sequencing and breaking down skills (Baine, 1977), and consultation with a physiotherapist in our program development (Gilroy, 1976) resulted in the curriculum and subsequent teaching programs which we employed for both home and school teaching. (See Appendix B, Section 3 for some examples of the teaching programs in this area).

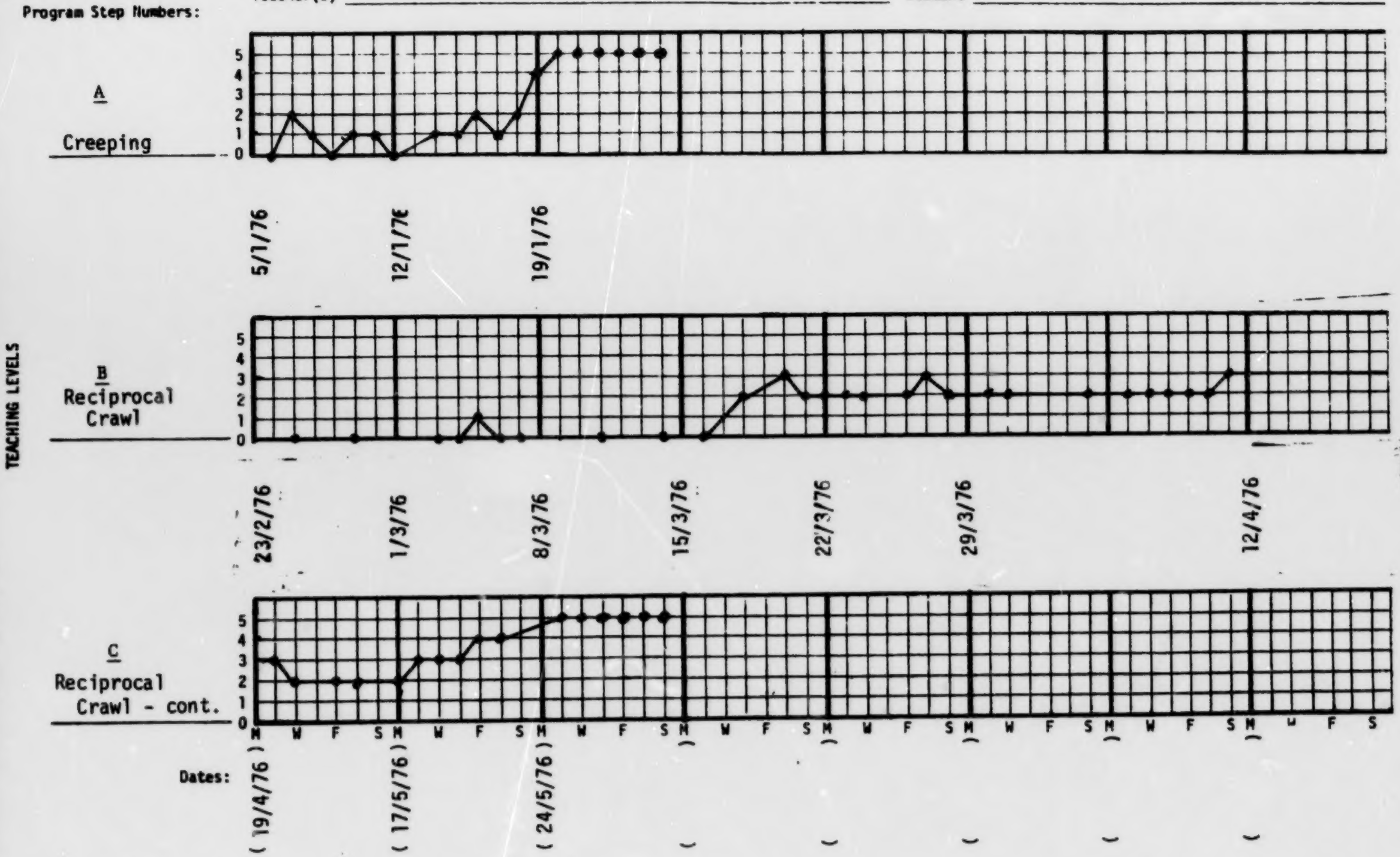
The program objectives thus included appropriate posture and means of attaining that posture since frequently the children do learn these skills with very poor posture. Often children with Down's Syndrome, for example, have a protruding head, stomach, and buttocks while their knees are hyperextended or locked producing the characteristic awkward still-legged gait. These programs were specifically developed to prevent the occurrence of these inappropriate characteristics with the very young child or to correct their occurrence before they are irreversible. Figure 7 provides an example of one child's progress through the motor strands for creeping and reciprocal crawling. When teaching in the

**TEACHING SESSION GRAPH**

## FIGURE 8

INFANT'S PROGRESS IN PROGRAMS FOR CREEPING AND RECIPROCAL CRAWLING

Teacher(s) ____________________ Student ____________________



motor area was initiated with him, he was able to sit and moved around the room by rolling. Since January 5, 1976 he learned to creep along the floor on his abdomen (as shown in Panel A of Figure 8) and to crawl with a reciprocal pattern on his hands and knees (as shown in Panels B and C of Figure 8). At the same time as these skills were being taught, his parents were also teaching him the appropriate posture for crawling. An interesting and typical feature of this data in Figure 8 is the plateaus experienced as the child moves through the program. Particularly in the motor development area, children reached and remained on plateaus within and between programs often having difficulty moving within a program between levels 2 and 3 at which point minimum guidance was being eliminated. This problem is quite clearly exemplified in Panels B and C; the continuous use of data regarding progress and observing the parents teaching were essential to attempt to attenuate or reduce this problem.

The data collection procedures employed in this area produce a great deal of information regarding children's progress through the teaching programs. Table 18 summarizes this data for some areas of motor development in which the parents were teaching. This data presents interesting aspects regarding this area of teaching. Again, except for one area, we find on the average relatively few teaching days required to attain criterion on these teaching objectives ($\bar{X}$'s of 25 or less). However, in contrast to the language and cognition areas, many more errors are being made in this area as can be seen in the mean total error column. This data reflects

## TABLE 18

## SUMMARY OF INFANT'S PROGRESS IN SEVERAL AREAS OF MOTOR SKILL DEVELOPMENT

| | N | Mean % Correct Baseline | Behaviors | Mean Trials to Criterion | Standard Deviation | Mean Total Errors | Mean Days to Criterion | Mean % Correct Review |
|---|---|---|---|---|---|---|---|---|
| Sitting | | | | | | | | |
| Posture-Sitting Unsupported | 4 | - | 10 | 103.8 | 121.6 | 21.7 | 19.2 | 100* |
| Assumption of sitting | 2 | - | 3 | 193.3 | 208.1 | 39.0 | 24.7 | 79.3* |
| Crawling | | | | | | | | |
| Posture-Balances Self | 1 | - | 1 | 35 | - | 4 | 11 | 100* |
| Assumption of Posture | 4 | - | 4 | 538.8 | 441.8 | 169.8 | 62.0 | 100* |
| Locomotion-reciprocal crawl | 7 | - | 11 | 350.4 | 512.6 | 77.9 | 24.7 | 88.8* |
| Walking | | | | | | | | |
| Posture-Standing Unsupported | 4 | 0 | 5 | 45.8 | 31.8 | 7.4 | 17.4 | 100* |
| Assumption of standing | 4 | 0 | 4 | 168.8 | 120.4 | 31.8 | 19.8 | 100* |
| Locomotion-walking unsupported | 7 | 0 | 21 | 56.0 | 73.0 | 11.4 | 12.8 | 100* |

*Not all children were assessed for review because of cumulative nature of program steps.

the fact that even with guidance the infants still have difficulty attaining many of these motor skills but with persistent teaching they do indeed attain them. A further important aspect of this table is the extensive variability between children in terms of the number of trials to attain mastery. The column with standard deviations indicates this high degree of variance ranging from 31.8 trials to a high of 512.6 in the case of attaining the reciprocal crawl. This variability underscores the importance of individualizing programs to families and employing a data collection procedure to monitor progress so that helpful changes can be made in teaching methods and programs. Finally, these data exemplify the fact that complex motor skills are indeed attainable by even very young infants and toddlers with moderate/severe handicaps when systematic teaching processes are employed to assist them in learning these skills.

### Self-help skills

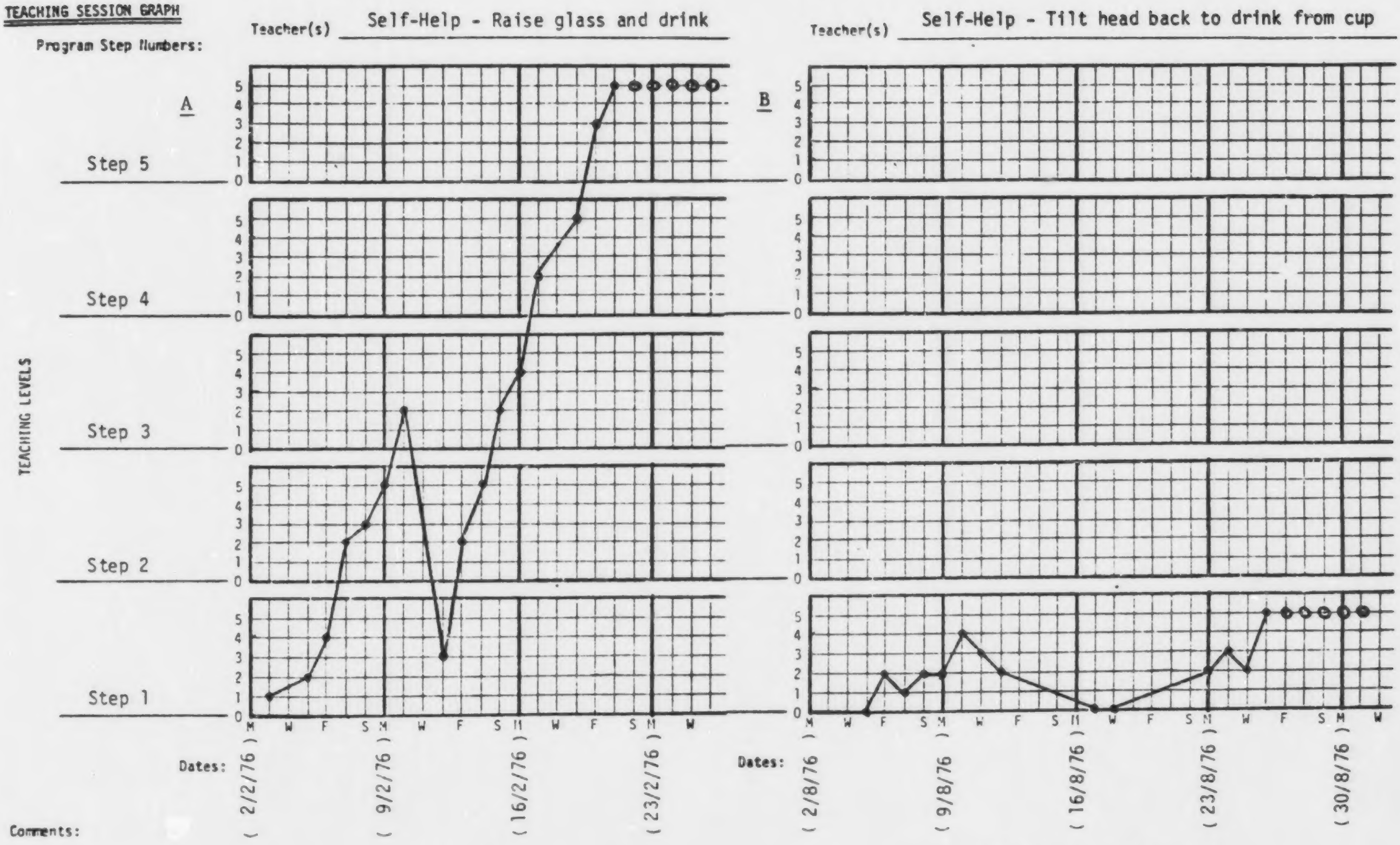
The skills taught in the home program in the self-help area include such activities as sucking and swallowing, feeding oneself, drinking from a cup, and learning to dress and undress oneself, as well as toilet training and personal hygiene. Little of the program involvement at home included this area due to the ages of the children; however, some examples will demonstrate the progress children made and a summary of a few areas will be presented. The developmental curriculum was employed to assess the child's competency in this area (see Appendix A for sequences of objectives) in order to determine if teaching would be required. Programs were then developed both from the work of Fredericks et al (1976) as well as from our own trial attempts; many of these self-help skills are taught using backward chains and all are taught in the child's natural environment as the behaviors naturally occur in order to maintain the ecological validity of the teaching/learning process.

Two examples of children's progress through self-help programs are presented in Figure 9. In Panel A, a child's progress through a program designed to teach him to raise his glass to his mouth using two hands and drink unassisted is depicted. The program involved several steps in a backward chain as it proved to be too large a task to teach at once; however, the steps proved to be too small for most children, thus necessitating the reduction of the sequence to three steps now. The need for fewer steps is inferred in this instance by the child's rapid movement through the program. These data indicate the manner with which data-based decisions can be made about the adequacy of the specific construction of programs.

An earlier aspect of this area of teaching is exhibited in Panel B, in which instance the child is learning to tilt his head back when given a drink from a glass and told to take a drink. Up to this time, the child tried to suck fluid from the glass by putting his face into it, resisting drinking from a glass and demanding his bottle. At the end of the program he was drinking well from a glass helped by his parents and no longer required a bottle. He then proceeded to the previously described program learning to hold and drink from a cup or glass. Programs developed for teaching in

FIGURE 9

PROGRESS THROUGH THE SELF-HELP PROGRAM FOR DRINKING FROM A GLASS



Comments:

13-month old infant

20-month old infant

this area are provided in Appendix B, Section 4 which emplify the methods employed. A summary analysis of three children's progress through the drinking from a cup program indicated that they acquired the skills over an average of 48 trials to criterion, averaging 5 teaching days, and averaging 2 errors per step or program. This level of performance demonstrates the rapid rate of learning possible when using a systematic teaching process and program format to assist the children's acquisition of these skills.

Direct Teaching Method's Effectiveness

In developing and implementing the early intervention process, another objective of the Early Education Project was to establish the validity of the method we developed as effective techniques for these purposes. The previous data illustrated the effects of introducing the teaching process by the parents into their child-rearing practices and in all instances the children were able to acquire the skills or concepts when they had been unable to do so on their own prior to the introduction of the intervention process. However, this type of before-after demonstration with its retrospective assumption regarding previous lack of learning and the quasi-experimental design failing to rule out the contribution of maturation, testing effects, other contributing variables, or practice effects does not allow for an unambiguous or unequivocal statement regarding the cause of these changes observed.

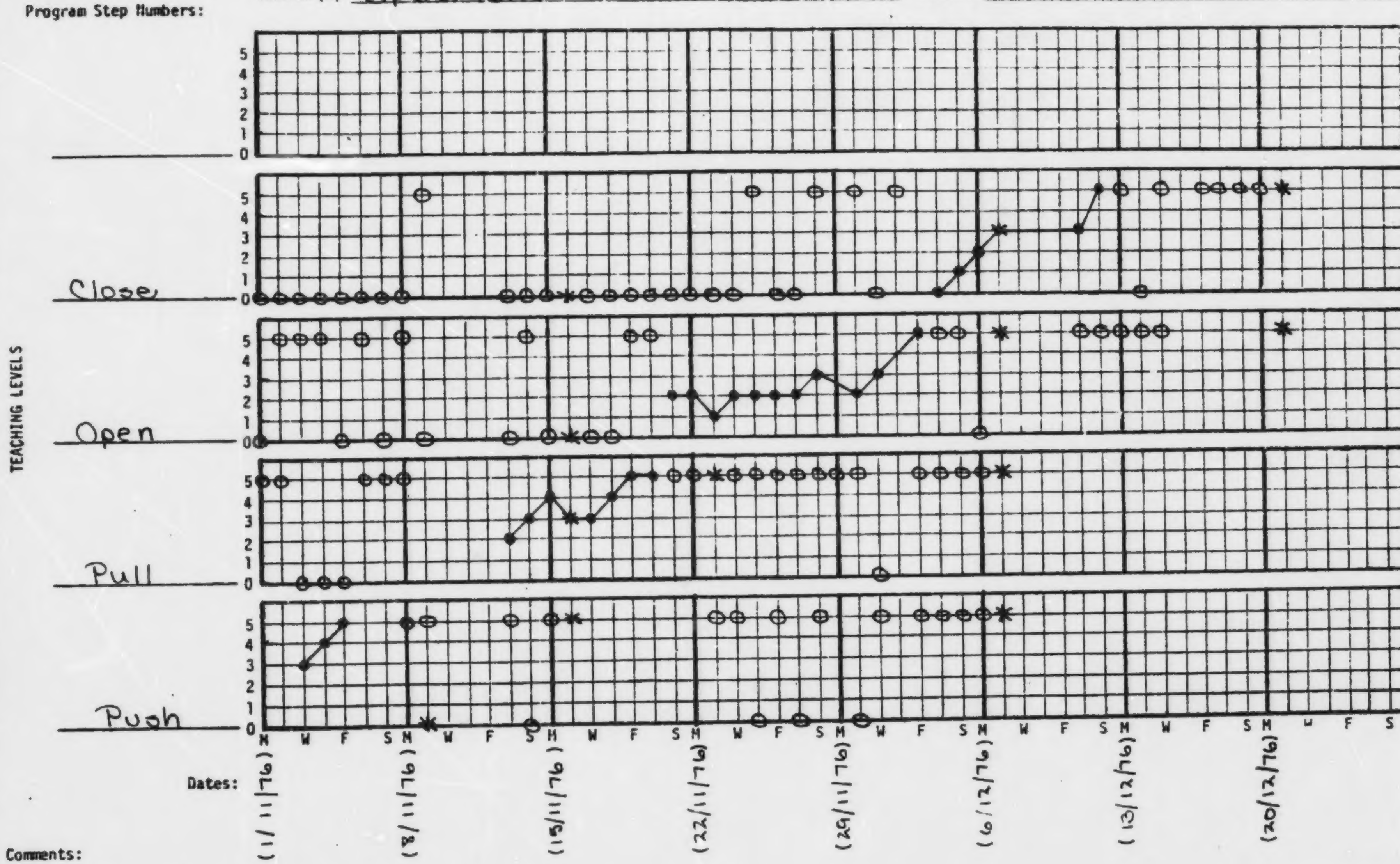
To further demonstrate the specific influence of the intervention procedures on children's skills, two additional examples are presented in which a multiple-baseline design was employed and allows for a more rigorous test of the effects of direct teaching upon skill acquisition. The multiple baseline design involves the measurement of several behaviors simultaneously with the sequential introduction of the intervention process to one behavior at a time, while continuing to monitor the baseline or pre-intervention level of the other behaviors. Once the first behavior is acquired the intervention is initiated with the second and so on. If the behaviors change systematically when the intervention is applied but not before, this effect strengthens the inference that the intervention was the effective agent in producing the change.

Figure 10 presents a multiple baseline analysis of the direct teaching model with the use of the operations program (see Appendix B) and four operations: push, pull, open, and close. The teaching method was first initiated with push while baseline or pre-intervention measures were being taken by the parents for the other three operations. These sets of actions were both assessed and taught using several sets of objects and materials to prevent rigid patterns of responding from being acquired. As can be seen in the figure, the operations were learned when taught to a spontaneous level 5 and typically maintained at that level after being learned.
Prior to teaching, the child generally did not respond correctly when assessed by the parents. This figure thus shows the specific influence of the direct teaching model upon the children's acquisition of these skills. The reliability of these data was verified in most instances by the home teacher's independent probes (shown as asterisks on the figure) supporting the changes reported in the parental data.

FIGURE 10

**TEACHING SESSION GRAPH** MULTIPLE BASELINE ANALYSIS OF THE DIRECT TEACHING MODEL WITH THE OPERATIONS PROGRAM

Teacher(s) Operations Student



Comments:

Date start : 3/11/76

Childs age at start : 20 months

Teacher probes *

Figure 11 presents a similar demonstration with an older child in the receptive language-object identification program. In this program, two receptive language concepts are taught simultaneously, such as "Show dolly" and "Show cup". When one is learned it is replaced by a third word and so on until 12 to 16 words are mastered (see Appendix B for program). In the process shown in Figure 11, ball and cup were taught first, while car, spoon, and block were simply tested once a day. The data reflects the child's learning of those concepts taught while responding sporadically or not at all to the ones which had yet to be taught. However, when they were taught, he mastered them and retained the concepts over several weeks of follow-up.

These two examples quite clearly demonstrate the specific helpful effects of the direct teaching methods employed. Of course changes often occurred much more rapidly than is indicated here. In fact, in many instances, children would exhibit a learning-to-learn or learning set effect in which the first few skills or concepts in a sequence would require extensive teaching whereas later ones would be learned in a few trials

### Parental Survey

After one year of operation, a survey of sixteen parents in the home program was conducted by the parent committee. Questions were posed regarding their perceptions of the project and its effects upon their child and their family. The results of the questionnaire are presented in Table 19. Nine of the sixteen families then involved responded to the extensive survey; their

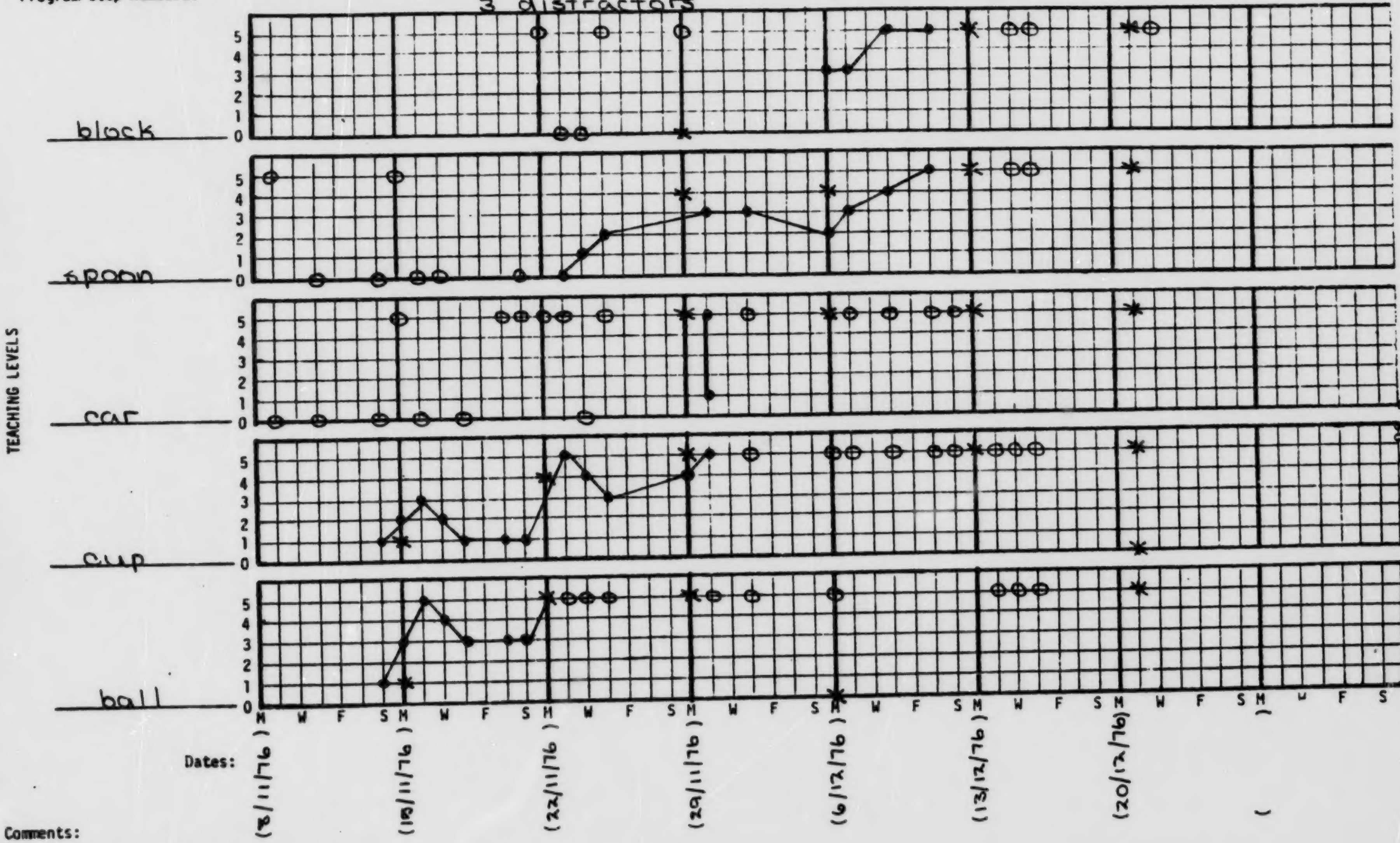
# FIGURE 11

**TEACHING SESSION GRAPH**

MULTIPLE BASELINE ANALYSIS OF THE DIRECT TEACHING MODEL WITH A RECEPTIVE LANGUAGE PROGRAM

Teacher(s) Receptive language: Point to with 3 distractors Student

Program Step Numbers:



Comments:

Date start: 14/11/76

Childs age at start: 37 months

Teacher probes *

## TABLE 19

## SUMMARY OF PARENTAL RESPONSES TO QUESTIONNAIRE REGARDING THE HOME PROGRAM

Nine out of sixteen returned.

1. Parents interested in continuing program: 9/9

2. Parents agreed that their child had progressed well in both cognitive and motor areas: 9/9

3. Parents said that they enjoyed the sessions with their child:
   1/9; enjoyed when child progressing well.
   6/9; enjoy sessions consistently.
   1/9; find sessions hard to get around to doing.

4. Communication is clear with the home teachers: 9/9

5. RE: Changes for Standard Teaching Procedure:

   Like present form of program: 7/9
   No answer: 1/9
   Child does not seem to fit into direct teaching procedure: 1/9
   (Of nine returned, four parents noted suggestions re: procedure.)

6. Parents felt the Home and School Proposals should be interlocked:

   Yes: 8/9
   No answer: 1/9

7. Parents are prepared to spend time at the school helping with their children: 8/9

8. Would regular meetings be beneficial?

   Parent meetings only: 1/9
   Both Parent Only and Parent-Teacher Meetings: 1/9
   Parent-Teacher Meetings: 5/9
   No answer: 2/9

9. Reactions to Assessment Tests Conducted in the Home:

   Positive: 5/9 Negative: 2/9 No answer: 2/9

10. Reactions of Children in General to the Program:

    Positive Noted: 4/9 Negative Noted: 0/9
    No Comment: 1/9 Mostly Positive with Comments: 4/9

11. Does child use skills taught directly in playtime activities or other household activities?

    Yes: 7/9
    No answer: 2/9

responses indicate the very positive outlook the parents felt after extensive involvement in the project. Two points of particular importance are their general satisfaction with the teaching procedures which were quite difficult for many of the parents to learn; secondly, *Item 11* indicates the generality of the skills taught to the child's everyday activities. This generalization to the other aspects of the child's life is crucial in terms of ensuring the ecological validity of the objectives in the developmental curriculum.

### Summary

The behavioral data from the home program provides three rather salient and crucial findings regarding the Early Education Project specifically and early intervention generally. First, very young moderate/severely handicapped children can definitely be taught skills/concepts very early in their lives successfully by their parents. These parent-teachers can manage teaching programs and monitor their child's progress quite effectively. *Secondly*, the learning process the child experiences when the direct teaching model is employed results in very rapid learning with very few errors in most instances, as the child masters new concepts and skills. This finding affirms the value and utility of the Test-Teach Method developed by the staff of the project as an effective and very positive approach to teaching. Punishment procedures were *unnecessary* as a method when these direct teaching procedures were systematically applied to assist the children's development. *Thirdly*, the children exhibited very high levels of retention when assessed following mastery of a program demonstrating the intact and functional memory skills they possess. Coupled with this finding, the parent's view of the application of these skills and knowledge to the child's natural environment greatly enhances the ecological validity and significance of this process.

## School Program

The last decade has seen a marked increase in the number and the quality of pre-school, classroom-based programs for moderately and severely handicapped children (Bricker and Bricker, 1976) with the assumption that this early intervention will attenuate the extensive retardation particularly in communicative, social, and cognitive skills and knowledge that older handicapped persons exhibit. Thus, as a logical sequence to the home-based parent training program, a classroom-based facet of the Early Education Project was established for toddler-aged and pre-school aged children. Although there were three groupings of children taught in the school program, their data will be presented as two groups; a toddler group roughly ages 2-5 and a pre-school group, ages 3-5. The children from the third class were grouped either in the toddler or pre-school group depending upon their functioning levels.

The classroom project operated in the Mayfield Elementary School, a school of the Edmonton Public School Board, occupying two classrooms in this building. The toddler classroom had its own toileting facilities and sink while the pre-school room used the normal student washrooms across the hall. The Early Childhood Services (E.C.S.) kindergarten program was across the hall and provided many opportunities for integrated experiences between the project students and their peers in the E.C.S. program. Also, activities with students from Grades 1 and 2 in the elementary school were regularly planned as part of the week's activities. Students participated in the Early Education Project classes in a morning class of seven toddlers, a morning class of eight pre-schoolers and an afternoon group of five children of both toddler and pre-school ages. Two additional students entered the morning classes for a total of 22 children in the school program. Table 4 describes the children in terms of ages and conditions of handicap other than Down's Syndrome.

### Teacher Training Program

The staff of the classroom included two teachers and two developmental assistants; these persons had varying degrees of entry skills from high school education to bachelor's and master's degrees. Their functions included child assessments, program development, direct and incidental teaching, and data collection processes to monitor progress. The in-service educational program was employed with the original four staff members with periodic training for incoming personnel. Three of the four staff remained for the duration of the project while the pre-school class teacher position changed two times, once due to inadequate implementation of the program and once due to impending motherhood.

The Behavioral Analysis System (Hillyard et al, 1976) was employed to analyze specific segments of the teacher's implementation of teaching skills periodically throughout the project; this data will not be presented here but it was utilized, where appropriate, to provide formative feedback to the teachers regarding their skills in direct teaching and accurate implementation of instructional programs and procedures. Through this method highly reliable teaching procedures were demonstrated by the teaching staff in their work with the students.

### Parent Training

Since the parents were expected to participate in the school program and attempt to maintain and generalize skills their children acquired at school to the home, a parent training program was initially primarily conducted by a research assistant to the project. The parents were taught the basics of the Test-Teach Model as well as methods of directly teaching their children in the same manner which was employed by the teachers. The parent trainer used modelling and behavioral rehearsal to facilitate the acquisition of these skills by the parents. Also, the behavioral analysis system and videotape feedback were employed to evaluate, before and after training, the parent's skills at direct teaching with their children.

The process familiarized the parents with the various aspects of the program and provided a basis for their involvement as direct teachers of their children. However, the home program training and teaching was also found to be very valuable in those four to five families who were involved in both home teaching and subsequently the school program. That is, five families were first in the home training aspect of the project and then began the school-based program. Generally, these parents (particularly the mothers) were very effective as assistants in the classroom when they volunteered each week during one of their child's school sessions. Thus, these persons were valuable as volunteers and rather reliable in attendance. In general, there was less than 50% attendance rate by parents for their volunteer days with particularly low attendance for the older children. However, when parents did attend, their assistance was extremely valuable. The presence of a parent or volunteer greatly facilitated more individualized programming for the students. Practicum students also participated (approximately 12 from the University of Alberta and 5 from Grant McEwan Community College) and assisted immensely in the operation of the classrooms.

### Daily Classroom Schedule

Morning classes were operated five days each week from 9:00 a.m. to 11:00 a.m. and the afternoon class was held four days each week from 1:00 p.m. to 3:00 p.m. with a staff meeting on the fifth afternoon. Typically, teaching sessions last ten minutes or less due to the children's limited attention span. The teachers would alternate hourly between individual and group instruction. That is, while one teacher is conducting one-to-one language sessions, the other teacher conducts group cognitive development, motor skills, or self-help skills teaching sessions. Ideally, these groups involve 3 to 4 children but without a parent or volunteer the ratio becomes higher - the teacher with 6 or 7 students.

Table 20 provides an example of the daily classroom schedule for both the teacher and the volunteer. The children arrived via cab or handibus at 9:00 a.m. each morning; at this time, as at departure time, various dressing and undressing self-help skills are taught such that they are ecologically valid in that environment. Each skill is taught using the teaching level, i.e., with appropriate guidance or prompts, appropriate for the child's level of progress. Their progress is monitored through the use of the MIMR data sheets and graphed on a weekly basis. As is shown on the schedule, several cognitive activities are planned each day. During these periods, the children work in a group necessitating very rapid movement from child to child to give everyone several chances while still maintaining the attentiveness of the whole group. Individualized motor skill programs were developed for use during the classes as well. Two 15 minute toileting sessions were scheduled each day. During this period, pre-schoolers were learning to sit and stand as well as put on and take off their pants; the toddlers were learning to pull off or put on their pants from a sitting position.

Juice time and snacks occurred mid-way through the session with incidental teaching of language being a significant part of this period. The pre-school group incorporated socialization and self-help skills into juice time and both groups were expected to utilize their highest levels of communication to obtain their juice and snacks. Following this period, art, music, and other

# TABLE 20

## WEEKLY SCHEDULE FOR THE CLASSROOM

| | Monday | (Volunteer) | Tuesday | (Volunteer) | Wednesday | (Volunteer) | Thursday | (Volunteer) | Friday | (Volunteer) |
|---|---|---|---|---|---|---|---|---|---|---|
| 9:00-9:15 | Undressing Incidental Teaching | Juice Art Prep | Undressing Incidental Teaching | Juice Get Book | Undressing Incidental Teaching | Juice Art Prep | Undressing Incidental Teaching | Juice Get Book | | Juice Prep |
| 9:15-9:25 | Cognition Writing | Set-up House | Cognition Writing | Set-up Store | Cognition Writing | Set-up House | Cognition Writing | Set-up Store | | Set-up House |
| 9:25-9.35 | Motor Exercises | Snack Prep. | Motor Exercises | Join Games | Motor Exercises | Snack Prep | Motor Exercises | Join Games | | Snack Prep |
| 9:35-9:45 | Story Corner | Sit with group | Story Corner | Sit with group | Story Corner | Sit with group | Story Corner | Sit with group | | Sit with group |
| 9:45-10:00 | Cognition Matching | Large Blocks | Cognition Lacing | Snack Prep | Cognition Matching | Large Blocks | Cognition Lacing | Snack Prep | MAINTENANCE | Large Blocks |
| 10:00-10:10 | Juice & Snack | Coffee | Juice & Snack | Coffee | Juice & Snack | Coffee | Juice & Snack | Coffee | | Coffee |
| 10:10-10:20 | Art | Help with Art | Music | Help with Music | Art | Help With Art | Music | Help With Music | Art | Help with Art |
| 10:20-10:30 | Toileting | Lotto | Toileting | Sorting | Toileting | Bending Animals | Toileting | Sorting | AND | Tracing |
| 10:30-10:45 | Washing | | Washing | | Washing | | Washing | | | |
| 10:45-10:55 | Cognition Cutting & Stacking | House | Cognition Puzzles & Operations | Store | Cognition Cutting & Stacking | House | Cognition Puzzles & Operations | Store | | House |
| 10:55-11:05 | Self-Help Fasteners | Sand/ Water Play | Body Parts | Sand/ Water Play | Self-Help Fasteners | Sand/ Water Play | Body Parts | Sand/ Water Play | PROBES | Peg Board |
| 11:05-11:15 | Self-Help Fasteners | Sand/ Water Play | Self-Help | Sand/ Water Play | Self-Help Fasteners | Sand/ Water Play | Self-Help | Sand/ Water Play | | Peg Board |
| 11:15-11:25 | Guided Play | Sit with group | Guided Play | Sit with group | Guided Play | Sit with group | Guided Play | Sit with group | | Sit with group |
| 11:25-11:30 | Dressing | | Dressing | | Dressing | | Dressing | | | |

activities are continued along with the on-going individual language sessions. Throughout the class, self-help sessions are conducted when they naturally occur. For example, after juice time, the children practice washing and drying themselves, thus learning these skills. Skills which do not occur during the class day are taught through home programs except for the fastener program which is taught at school due to its complexity and generalized to home when the skills are learned. Once a week probes are obtained to check on the children's retention of skills and knowledge they have acquired through the direct teaching process.

Language Instruction

As in the home program, language instruction and communication skills constituted a major teaching area, particularly with respect to functional skills (i.e. useful and applicable) the children may require in their natural environments. The programs in the language area included both expressive and receptive programs although the emphasis was definitely placed upon functional expressive language skills. As for the in-home portion, the school program developed instructional programs based upon the work of Guess et al (1976), Striefel (1974), Bricker and Bricker (1970), Kent (1976), and Stremmel-Campbell et al (1976); these programs included attention training, motor imitation and later action imitation, sound and word imitation, one word labelling, one word comprehension for object identification, question-asking and imperatives such as "What's that?" and "(I) want cookie!" to phrasing such as "(I) play!" and "(I) eat cookie!" in the early stages of verb training. The children's progress through these programs will be presented for the imitation training phase and the functional language programs separately.

### Imitation Training

The imitation training series consisted of a series of programs designed to prepare children for entry into the functional speech and language program developed by Guess et al (1976). This pre-program series consisted of developing generalized word imitation with the children for 16 common nouns or verbs which are easily distinguishable from each other. This requirement was difficult for the toddlers since initially none of the toddlers would imitate sounds or words and many of the children wouldn't imitate actions or motor behaviors.

After an initial 8 months of teaching motoric and sound imitation, program changes were initiated. Integrating current research (Stremmel-Campbell et al, 1976) and our experiences and frustrations with motor imitation training, three major points regarding language instruction were clarified. First, children should be started on sound and word imitation as soon as possible rather than spending an inordinate amount of time on motoric imitation alone. Secondly, language training should be as functional (useful) as possible. For example, motor imitation,if this step is necessary, should be as functional as possible. That is, having a child imitate table-tapping isn't very useful whereas imitating putting on a hat or hair-combing is quite useful. Also, when teaching words such as "ball", the teacher would hold up the object so that receptive comprehension is enhanced as well as expressive training. Thirdly, manual sign language might facilitate learning sounds and words. Subsequent research (McDonald, 1977), however, suggested that this was not the case.

The new language sequence for the toddler classroom thus began with an Attention component similar to the original. The children were taught to attend to the verbal signal "(child's name), look!", plus a hand signal. When the children consistently attended, the hand signal prompt of the attention cue was faded out.

Following attention teaching, the Actions/Sounds component was begun; this revised sequence taught imitation of both sounds and functional actions (gross motor behavior) in a randomly alternating sequence. As soon as the child learned to imitate two sounds she proceeds with two new sounds and actions are not taught anymore. The new actions were all functional, e.g. turning a crank on a jack-in-the-box, putting on a hat, putting a penny in a bank slot, etc.. In addition to being functional, materials (stimuli) and the resultant activities were chosen which had an inherent natural reinforcing value in and of themselves. After a correct imitation, the children were given the object for play; this procedure permitted the teacher to then teach a receptive language concept by saying, "give name of toy" when she wanted the object. When teaching sounds, the teachers also associated the sound with a gross motor behavior consistent with a short word having the sound in it. For example, the teacher might say "ooo" while pushing a toy boat cross the table. She would then give the boat to the child prompting her to imitate the gross motor response while imitating the sound (Appendix C presents this program). Figure 5 in the home program section presented the typical child's progress through this program.

The third component of the imitation training sequence, Sound/Word Imitation, consisted of teaching a sound and a word on randomly alternating trials. Sound imitation training is identical to the Action/Sound Imitation procedures, whereas for word imitation, the object the word represents is always present and given to the child as an activity reward (Premack, 1965) if the word is correctly imitated. Gross approximations were initially excepted and a shaping process was employed to gradually approximate the correctly articulated word. (Appendix C presents this program).

The final component of the imitation sequence, Word Imitation, was initiated after two words were reliably imitated in the previous Sound/Word Imitation component. This program is identical procedurally to the word segment of the previous step. In this component the child is directly taught to imitate sixteen functional nouns or verbs. At the time of implementation of this new sequence, Linda McDonald (1977) along with the other teachers began an investigation of the differential effects of three methods of teaching word imitation: (1) imitation cue alone, "Say word!"; (2) imitation cue with the physical and verbal prompts for Levels

3, 4, and 5 of the Direct Teaching Model; (3) imitation cue with the manual sign "Talk to the Deaf", Riekhof (1963) for the word provided. Her results indicated that the three conditions were equally effective in teaching word imitation and that all three conditions led to more rapid acquisition of one word labelling and one word receptive identification (Steps 1 and 2 of the Guess et al program) than the procedures employed with the first 6 children taught in the Early Education Project.

The data for the toddler children's progress through the programs in the expressive language area is summarized in Table 21. These data present interesting findings in terms of the children's learning skills. Eleven children were participants in the toddler phase of the program with an average age at the beginning of teaching of 31.09 months (Standard Deviation 11.7) and a range from 20 months to 60 months. The five children requiring attention training took an average of 115.7 trials to learn to attend reliably over 6.2 teaching days. This period represents a fairly rapid rate of learning to attend to an adult. The earlier motor imitation sequence was taught to 9 children for 49 specific motor acts requiring an average of 53.4 trials to learn to imitate; this data is contrasted with the 4 children learning 36 functional actions in an average of 12.3 trials to criterion. This difference represents a significant savings effect. Also, very low error rates were found teaching motor acts and functional actions, 6.1 and .46 respectively. Sound imitation training was taught to 8 children for 19 sounds requiring 48.2 trials to criterion, on the

## TABLE 21

## SUMMARY OF TODDLER'S PROGRESS IN THE EARLY LANGUAGE PROGRAMS

| Expressive Language | N | Mean Baseline | Behaviors | Trials to Criterion | Standard Deviation | Mean Total Errors | Mean Days to Criterion | Mean % Correct Review |
|---|---|---|---|---|---|---|---|---|
| Attention Program | 2 | _ | 6 | 115.7 | 98.0 | 14.0 | 6.2 | 94 |
| Motor Imitation | 9 | - | 49 | 53.4 | 55.5 | 6.1 | 8.5 | 88.5 |
| Action and Imitation | 4 | - | 36 | 12.3 | 9.7 | .46 | 2.2 | 86.1 |
| Sound | 8 | - | 19 | 48.2 | 46.8 | 12.9 | 9.5 | 80.1 |
| Word Imitation | 11 | - | 123 | 28.7 | 29.4 | 21.8 | 3.8 | 89.3 |

average, for reliable sound imitation. A higher error rate, an average of 12.9, was evidenced for this component, due to the articulation and substitution problems several children had in producing sounds. Word imitation was taught to 11 children for 123 words requiring only 28.7 trials to reach criterion, on the average. This level of learning indicates the effective nature of this instructional model and these programs, taking an average of 3.8 days for a child to reach criterion on this component. In this component, the error rate was rather high, 21.8 total average errors, suggesting that the children tended to make many errors until they learned the correct word and then made few mistakes after the word was reliably being imitated.

The review data, all above 80% for these components, indicates the high degree of retention of this material the children exhibited. These data overall show the rapidity with which the children were able to master these previously unexhibited skills and the generally low error rates exhibited as a result of the Direct Teaching Model's use of extensive prompts and guidance. Although receptive language in terms of object identification was taught to these children, the data is part of another investigation and thus isn't presented here. However, all of the children in the object identification program did learn this skill within 2 - 4 weeks of teaching.

### The Functional Language Program

Recently, the provision of instruction in communication skills to the moderately and severely handicapped has increased considerably (Snyder, Lovitt, and Smith, 1975). One such development in this field was the functional speech and language training program produced by Guess, Sailor, and Baer (1976). The Early Education Project, through an agreement with the authors of that program, became a test site for the use of the program in Canada prior to its eventual publication. There are six categories or general areas in the program: Persons/Things (Noun Training), Actions with Persons/Things (Verb Training), Possession, Color, Size, and Relations/Locations. Children in the Toddler and Pre-School classes were learning the nine steps in the Persons/Things phase and the first four or five steps in the Actions with Persons/Things phase.

The Persons/Things steps include one word labelling of objects, pointing to and asking for objects, asking "What's that?" for novel objects and and answering yes/no questions. The first few steps of the Actions sequence includes labelling actions and identifying various different actions as well as describing what actions the child wants to do. During each teaching day one teacher instructs every child for a 10 - 15 minute individual language training session consisting of 32 trials. On each trial, the teacher gave an attention cue such as "Lisa, look!" followed by the appropriate direction and material for that step, e.g., holding an object the teacher asks, "What's that?" If the child answers correctly she is rewarded with praise, precise feedback and the apple, and sometimes a consumable reward such as food. The child's correct answer is recorded on a data sheet, as a plus, and the next trial is presented.

If, however, a child does not respond or gives the wrong answer, a correction procedure is employed (Guess, Sailor, and Baer, 1976; Becker, Engelmann, and Thomas, 1975b). First, the teacher says "No!" or "Wrong!", indicating the child's incorrect answer or silence is wrong. Second, the teacher models the correct answer, e.g., "That's a ball!" Third, the trial is repeated with a correct answer being rewarded as above while an incorrect answer is ignored. Then, the incorrect response is scored on the data sheet as a minus.

Consumables such as food are used as rewards during some language sessions primarily when a child is learning a new step word in the program. It is always preceeded by praise and precise feedback and as soon as a child reaches 30% correct per day the food is faded to a variable ratio 3 schedule or arrangement and is eliminated when 60% accuracy is first attained by the child. Because of their ages and handicaps perfect articulation and pronunciation are not expected. Once a child begins imitating a new word at a high rate, the best approximation made is shaped. These approximations were often accepted as correct if they were consistent and distinguishable from other words in the child's repertoire.

For each step of the Guess et al program, criterion was attained if 80% correct answers were given for a session (a session included 64 trials) or 12 correct responses in a row. The next phase or step was begun as soon as this criterion was met.

Skill tests were given before some steps and at specified intervals during the step to determine if the child could attain mastery of the skill or knowledge without further teaching (Appendix A presents the objectives for each step of the program).

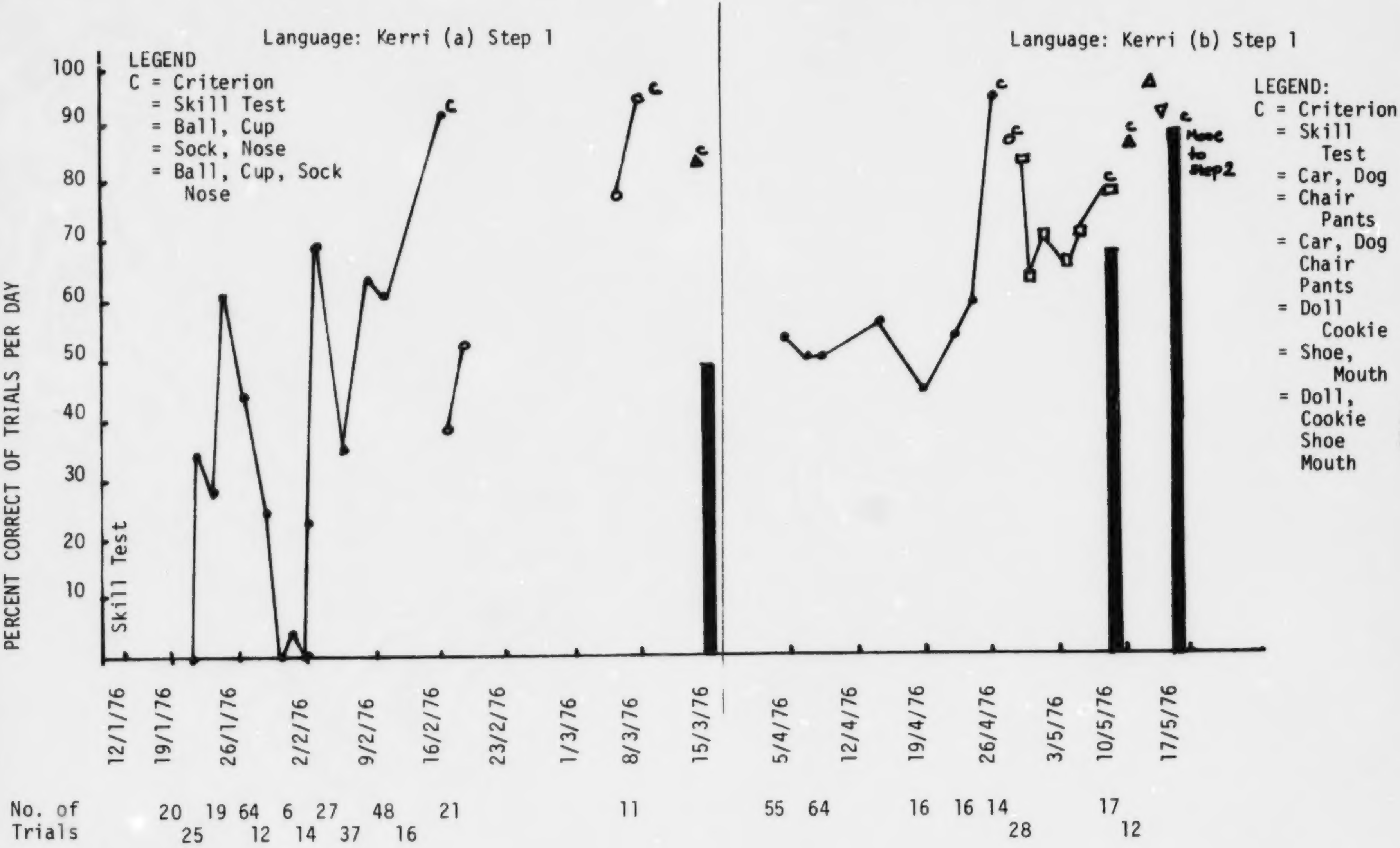
An individual child's progress through Step 1 of the program is shown in Figure 12: the percent correct for trials per day is shown up the left side of the graph (Y-axis) and teaching dates (days) are shown across the bottom of the graph (X-axis). The objective for this step is to reliably label *16* common objects. The skill test is shown as a bar graph, occasionally, in the figure. Initially Kerri scored zero on the skill test so teaching was initiated with the teaching of two words, ball and cup. If she had labelled any object correctly on the skill test, one of these would have been paired with an unlabelled object for the initial teaching pair to insure some success for her in the program. Two objects are taught together randomly alternating from one to the other. In each session, *64* trials are presented in a random order usually covering *2* teaching days. These two words are taught until criterion is attained - shown as a *C* in the figure. Then, a second *pair* of words is taught to criterion; finally all four words are taught. When criterion is obtained for all four, the skill test is repeated. This figure shows that Kerri was trained on three sets of *4* words until she met criterion on the skill test and moved on to Step 2. The particular point of significance in this graph is the *savings effect* from the first through to the third set of four words wherein the last four were learned in one day each whereas the first four took almost three months to acquire. This savings effect was often present in these programs for the children.

Table 22 presents the summary of the children's progress through the first 15 steps of the Guess et al. program. Several aspects of this data are quite significant. Step 1 shows the performance for the toddler compared to the pre-school class; the toddlers having had the prerequisite revised imitation sequence whereas the pre-schoolers had the original gross and fine motor imitation sequence. As the figures indicate, the toddlers required approximately 1/3 as many trials to attain criterion as the pre-schoolers. Whereas on Step 2, the pre-school children were quite a bit faster in mastering the object identification skills. This effect seems largely due to the extensive imitation training the toddlers had prior to beginning Step 1 of this program. Of considerable import is the fact that the steps required an average of 22.9 or less days of teaching for the children to attain criterion, once again a clearly demonstrated example of the rapid rate the children exhibited in learning these new language skills.

It is particularly important to note the difficulty children had learning to use the logical yes/no answers to interrogatives ($\bar{x}$ of 769.6 trials to criterion and $\bar{x}$ of 22.9 days of teaching). This step (#7) was one of the most difficult in the program, requiring several phases and sub-steps. However, these children were able to acquire these concepts and skills and use them in

## FIGURE 12

SUMMARY OF KERRI'S PERFORMANCE FOR STEP 1 OF THE FUNCTIONAL LANGUAGE PROGRAM



## TABLE 22

## SUMMARY OF SCHOOL CHILDREN'S PROGRESS THROUGH THE FIRST 15 STEPS OF THE FUNCTIONAL LANGUAGE PROGRAM

| Persons/Things | | N | Percent Baseline | Mean Trials to Criterion | Standard Deviation | Mean Days to Criterion |
|---|---|---|---|---|---|---|
| Step 1 - Label | *T | 5 | 40.6 | 353.2 | 260.0 | 14.40 |
| | PS | 10 | 24.0 | 977.4 | 608.9 | 39.7 |
| Step 2 - Identification | T | 4 | 61.2 | 228.9 | 217.6 | 9.0 |
| | PS | 9 | - | 139.2 | 263.5 | 5.2 |
| Step 3 - "Want _____!" | | 7 | - | 304.9 | 153.9 | 14.0 |
| Step 4 - "What's that?" | | 4 | - | 219.8 | 134.3 | 9.2 |
| Step 5 - New Names | | 4 | - | 114.5 | 173.1 | 3.5 |
| Step 6 - Memory of Names | | 3 | - | 110.0 | 34.6 | 3.7 |
| Step 7 - Yes/No | | 7 | 3.3 | 769.6 | 431.3 | 22.9 |
| Step 8 - Using "I" | | 6 | - | 206.2 | 131.4 | 7.8 |
| Step 9 - Naming and Requesting | | 4 | - | 398.8 | 229.2 | 14.7 |
| **Actions with Persons/Things** | | | | | | |
| Step 10 - Label Action | | 4 | - | 184.8 | 110.7 | 6.2 |
| Step 11 - Label Action with Something | | 3 | - | 137.0 | 150.1 | 4.7 |
| Step 12 - Yes/No to Action | | 3 | | 75.0 | 112.6 | 4.3 |
| Step 13 - Labels another's Activity | | 3 | | 108.7 | 74.1 | 4.0 |
| Step 14 - Labels another's Actions with Something | | 1 | - | 56 | - | 2.0 |
| Step 15 - Differentiates Between I/You | | 2 | - | - | - | - |

*T - Toddler Class
PS - Pre-School Class

varied contexts indicating their skills and knowledge were indeed quite strong. A final point involves the rather rapid rate of acquiring the skills in the verb steps of the program. The children required 184.8 or fewer trials for the acquisition of the various steps in this sequence. This savings effect as the children proceed through the program largely results from the way in which the programs build upon one another in the teaching sequence, facilitating the acquisition of new concepts because of previous learning.

### Cognitive Programs

Teaching skills and knowledge in the area of cognitive development has received wide attention in recent years (Bricker and Bricker, 1976; Uzgiris and Hunt, 1975) particularly with respect to the development of fine motor skills, memory, and higher order concept and rule learning by potentially moderate to severely handicapped children. As the sequence in Appendix A indicates, the programs employed by the teachers in the Early Education Project included skills and concepts from fine motor prehension skills in infancy through to writing, matching, operations, and classification skills in the pre-school classroom.

Initially, through the use of the Portage Guide (Shearer et al., 1972) each particular cognitive behavior was assessed and taught. However, this method proved to be quite cumbersome and inadequate since the children would thus not be working on the same task, making group work very difficult and they were learning a series of isolated motor acts rather than a group of interrelated operations or class of actions or concepts. Thus, the cognitive skills and knowledge were broken down into the series of strands presented in Appendix A and described earlier.

Each strand has a specific terminal objective (e.g. puts _6_ pieces in an interlocking puzzle) and a number of sub-skills (e.g. puts a circle and square in a form board, puts _4_ pieces in a non-interlocking puzzle). The children thus work on a number of cognitive strands at the same time depending upon their competencies as assessed through the criterion referenced assessment procedure. In this manner, the students in each class, toddlers and pre-schoolers, are grouped according to these skills and taught in small groups of _3_ or _4_ children.

Table _23_ lists the strands most frequently taught in the toddler and pre-school classrooms and for which data regarding students' progress will be presented. Programs for teaching some of these objectives are provided in Appendix C, although not all programs are shown there. The toddler classes were working on programs for learning operations, stringing, stacking, puzzles, and writing strands, while the pre-school group was learning more complex skills in these strands in addition to body parts for self-awareness and following three word instructions. The operations strand will be reviewed to exemplify the general teaching procedure for these programs.

The operations taught were "put in", "put on", "take out", "take off", "push", "pull", "open", and "close". Before starting the programs, a five day baseline assessment is taken for each

## TABLE 23

## DESCRIPTION OF CATEGORIES IN THE COGNITIVE AREA INVOLVED IN TEACHING PROGRAMS IN THE SCHOOL PROJECT

Operations:

Put in, Put on - child will place an object in or on a specified receptacle or area.

Operations - child will respond correctly to one of eight different commands.

Operations with distractors - same as operations with the addition of distracting items.

Body Parts Program:

Show Nose - child will identify on self or doll, or place on doll significant body parts.

Stacking Program:

Stacking Rings - child will place rings on a peg.

Stacking Blocks - child will build 2 block, 3 block towers and 3 block and 6 block pyramids.

Puzzles Programs:

Form Board - child will place appropriate forms in puzzle board.

Puzzles - child will complete 4 to 6 piece puzzles, both interlocking and non-interlocking.

Lacing Programs:

Stringing Beads - child will place beads upon a string.

Lacing - child will lace holes in lacing board or actually lace shoes.

Writing Programs:

Pencil Grasp - child will hold crayon or pencil in hand.

Writing Sequence - child will make strokes, lines and letters with pencil from an example.

Matching Programs:

Matching - child will match identical or similar objects without and with additional distractors.

operation being taught. The instructions remain constant e.g., "push" or "put on", while the materials used to test each operation are changed each day (e.g. push a toy car one day, a toy wagon the next, a block with a button on top the third day, etc). After this test, the child is taught those operations not mastered correctly (4 of 5 times correct) during baseline. Two operations are taught together as in the language program insuring the child learns to discriminate throughout training. When criterion is attained for all 8 operations the next phase in the strand is taught.

Table 24 provides the summary of the children's progress through the various strands of the cognitive objectives in the curriculum. Generally, these data are summarized across children, behaviors within a specific category, and steps within programs for those behaviors or categories. Generalized operations are considered very important (Becker, Engelmann, and Thomas, 1975b) for two specific reasons. First, they provide the child with a series of skills to more adequately explore and acquire information from their environment. These skills enhance their exploratory capacity. Second, the skills are influenced by the adult's commands or instructions to respond resulting in the child responding receptively to the cues. Thus, communicative interactions between adults and the children are enhanced through the acquisition of these operations. As can be seen in Table 24, operations without and with distracting items were acquired quite rapidly, on the average, with very few errors

## TABLE 24

## SUMMARY OF CHILDREN'S PERFORMANCE IN THE COGNITIVE OBJECTIVES OF THE CURRICULUM

| | N | Percent Baseline | Behaviors | Mean Trials to Criterion | Standard Deviation | Mean Total Errors | Mean Days to Criterion | Percent Correct Review |
|---|---|---|---|---|---|---|---|---|
| Operations | | | | | | | | |
| Operations | 8 | 30.8 | 33 | 25.8 | 33.0 | 4.3 | 7.6 | 94.6 |
| Operations with Distractors | 5 | 18.8 | 17 | 15.1 | 8.6 | .8 | 6.4 | 91.4 |
| Body Parts | | | | | | | | |
| Program 1 | 9 | 39.3 | 59 | 17.7 | 12.8 | 6.7 | 2.2 | 93.6 |
| Program 2, 3, 4 * | 8 | 85.4 | 8 | 8.2 | 5.0 | 2.0 | 2.3 | 100 |
| Stacking Programs | 13 | 10.4 | 33 | 32.7 | 28.5 | 2.8 | 12.7 | 85.3 |
| Puzzles Programs | 14 | 9.23 | 46 | 14.9 | 14.7 | 1.16 | 7.9 | 86.5 |
| Lacing Program | | | | | | | | |
| Stringing Beads | 4 | 30 | 5 | 11.2 | 8.1 | 1.0 | 5.6 | - |
| Lacing | 9 | - | 17 | 18.4 | 16.3 | 1.5 | 9.7 | 100 |
| Writing Programs | | | | | | | | |
| Pencil Grasp | 6 | - | 13 | 13.5 | 8.4 | .85 | 7.5 | - |
| Writing Skills | 9 | - | 49 | 20.6 | 27.7 | 2.0 | 11.6 | - |
| Matching Programs | 15 | 30 | 49 | 9.7 | 7.6 | .3 | 4.4 | - |

*Programs 2, 3, 4 almost always learned as probes or baseline above 80%.
Thus, only 8 behaviors were actually taught, Baseline is for 64 behaviors.

occurring. These findings indicate the high rate at which the children were able to learn the skills involved in operations; also, the few errors demonstrate the positive aspects of the teaching model incorporating the guidance and prompting procedures.

The body parts program consisted of several levels of teaching the children notions of self-awareness related to the identification of their own body parts and similar characteristics on dolls or pictorial representations. The final stages of the program (unattained by most of the children) included drawing figures and more complex representations of people. As the data in Table 24 indicate, few trials were required to teach this program ($\underline{\bar{x} = 17.7}$ for trials to criterion) in an average of 2.2 days of instruction. Also, it is quite important to note that for the second program 85.4% of the probes were done correctly which indicated very high degrees of transfer from the first program to each of the later successive programs. This very strong learning set effect indicates the positive transfer or generalization exhibited by the children and supports the notion that their learning processes seem to be quite effective and intact in terms of previous work demonstrating this effect (Reese, 1963).

The data from teaching the stacking and puzzles programs provides significant evidence that the students were quite capable of learning complex visual-fine motor skills as well as problems involving parts-whole solutions, prior to the age of five years in several cases. It is indeed impressive that an average of 32.7 trials to criterion for stacking and 14.9 trials to criterion were required on the average in order for the children to attain competency in the various steps and phases of the programs. It is also notable that only 2.8 and 1.16 average errors were made in the stacking and puzzles sequence respectively, demonstrating the overall positive or virtually errorless learning effects of the direct teaching methods. Review trials, as for the previously described programs, also indicates remarkably high rates of retention of the skills learned (85.3 and 86.5 percent correct respectively). Similarly the lacing program demonstrates the very rapid rate at which the children were able to master the five-notch, eye-hand coordination skills involved in the steps of this program (11.2 and 18.4 trials to criterion for stringing beads and lacing sequences respectively) as well as the very low error rates (1.0 and 1.5 mean total errors respectively).

The writing program represents a sequence of skills being taught beginning with grasping and holding a pencil or crayon and gradually increasing the use of the writing instrument from copying lines through to initial letter reproduction. The sequence of skills was essentially derived from the work of Fredericks et al (1976) and was employed along with the Direct Teaching Model for instruction purposes (Appendix C presents examples). As the data demonstrate in Table 24, the children progressed very rapidly through the various steps in the programs, averaging 13.5 trials to criterion to learn the pencil grasp and 20.6 trials to master the various steps in the writing sequence. However, the standard deviation of 27.7 for the writing strands shows the extensive variations across the nine children learning in these steps and the 49 behavior skills taught. This variability reinforces the importance of monitoring each child's progress through programs to insure that each person is learning as well as he is able from the instructional program. Again, the very low error rates (.85 and 2.0 respectively) reveals the predominantly errorless learning process resulting from the use of the direct teaching methods.

Although it was one of the latest programs initiated, the matching program was used with 15 children for 49 steps or phases. This program taught the children basic concepts and classifications, employing a teaching format that began with very simple matching and proceeded to gradually increasingly complex matching with distractors and complex classifications on the basis of size, shape, and color. As in the previous programs, the children mastered these steps fairly quickly, averaging 9.7 trials to criterion through the steps in 4.4 teaching days; also, their extremely low error rate, .3, reflects the almost errorless process they experienced in learning. This level of performance again reinforces the conclusion that the children were quite capable of learning complex skills and concepts rather quickly and with very few errors and could retain these quite well over several days and weeks. These findings support the approach of gradually providing increasingly complex learning activities leading up to pre-school and early school-relevant concepts and skills.

Motor Skill Development

As it was described in the section reporting the home program, motor skills were assessed along the continuum of the developmental curriculum particularly from crawling through walking, running, and jumping for the children in the school-based program. The motor development strands (see Appendix A for the complete list) were divided into postural, assumption of posture, and locomotion segments with the assessment procedure indicating on which areas the children required teaching and guidance. As part of a master's thesis research project, Madill (1977) has demonstrated the ordinal nature of the sequence of objectives in this area. Programs were developed with the assistance of material from the work of Fredericks et al (1976) as well as through consultation with the physiotherapist assisting the project (Gilroy, 1976). Appendix C presents some examples of the teaching programs used in this area.

Along with guidance and prompting from the direct teaching model, various types of stretch and resistance methods were incorporated into the instructional programs. At levels 1 and 2 of the direct teaching model, a stretch exercise is given prior to a trial. This exercise is a quick stretch movement by the teacher that will assist the child into the appropriate position by forcing her/him into a more extreme posture. For example, if a child is sitting with rounded shoulders, the teacher would give a quick push down or stretch on the shoulders perpendicular to the floor. The child's immediate response is to resist the push and straighten up - which is the desired position.

At level 3 the teacher provides the push or resistance during the trial rather than before so the child is working harder to assume the position. This action is never so forceful as to impede the motion, only to slightly resist it. The resistance is then discontinued for the last two teaching levels (levels 4 and 5). Once the target behavior is achieved three times consecutively at level 5, it is reviewed for 5 days and followed up for 5 weeks after that.

The children were assessed individually and were placed on one or more programs depending on their skills. For example, one child in the toddler program was working on the posture component of the sitting program to correct for rounded shoulders, the posture component of the walking program to correct his hyperextended knees and poor balance, and on the locomotion component of the walking program to teach him to walk with a flexible string as support.

The students in the pre-school class were learning the correct posture and locomotion phases of the walking program. A series of exercises accompany the steps of the walking program to develop the control, flexibility, or muscle strength needed to maintain the target posture. Each child was given 2 - 3 minutes of exercise each day before his/her trial on the program. The exercises included simple activities such as sit-ups, marching, and obstacle courses. Several children completed this walking program in both classrooms and some moved on to more complex programs such as standing on one foot, hopping, and jumping. All of the toddlers except two had moved from the initial crawling-precrawling phases to coordinated walking and running in some cases. Because of the complex nature of the motor programs, specific validation of these teaching procedures is not yetcompleted;thus, no behavioral data is presented of children's progress through these teaching steps. However, the teachers did incorporate the methods into their incidental teaching procedures teaching these complex postural and motion components during ecologically appropriate times of the day such as walking to the gym or bathroom or moving from one activity to another.

### Self-Help Skills

As in the home program, self-help skills were assessed initially according to the sequence from the Portage Guide (Shearer et al., 1972) and a range of teaching objectives established from this information. However, due to the inadequacy of the Portage sequences particularly because of the lack of logical relationships across objectives, several series of interrelated strands were developed as in the other areas; in these strands overall terminal objectives were established and sub-skills or enabling objectives were sequential from simple to complex leading up to the objectives. Appendix A presents the series of objectives and their definitions as we used them for assessment purposes. The efforts of Martin et al.,(1975) and Fredericks et al., (1976) were utilized extensively in developing programs to teach these skills. Several examples of programs are presented in Appendix C in which the use of the principles of successive approximation, backward chaining, and fading of cues are exemplified in developing and teaching these skills. Many of the self-help programs involved the use of task analysis procedures, including the process of backward chaining which seemed most effective for teaching these skills. The general areas in which self-help skills were taught included dressing skills, washing hands and face, eating skills at juice times, and self-maintaining toileting practices. A major reason for directly teaching some of these skills was to enhance the independent functioning of the children so that they would be able to live more adequately in a normal social milieu.

A summary of the children's progress through the dressing and washing programs is presented in Table 25. The table presents data on average trials to criterion, errors, days to criterion, and baseline performance for children and was collated also across steps in the programs. The first section represents programs teaching the children to put on various types of clothing and except for learning to put their arms in and do up zippers, the children learned these skills very quickly. It is also notable that very few errors occurred in these programs, again demonstrating the errorless process involved with the direct teaching model. An additional point in this table is the more complete baseline data showing the effects of teaching where the children in most instances were unable to complete any of these skills prior to the initiation of direct instruction. The second segment of the table presents

## TABLE 25

### SUMMARY OF CHILDREN'S PERFORMANCE IN THE SELF-HELP PROGRAMS

| | N | Percent Baseline | Behaviors | Mean Trials to Criterion | Standard Deviation | Mean Total Errors | Mean Days to Criterion | Percent Correct Review |
|---|---|---|---|---|---|---|---|---|
| Clothing On | | | | | | | | |
| Arms in | 7 | 13.2 | 7 | 34.1 | 15.8 | 1.9 | 34 | 100 |
| Coat on | 14 | 2 | 46 | 12.1 | 7.8 | .5 | 11.3 | - |
| Pants on | 8 | 12.5 | 22 | 19.9 | 11.8 | 2.0 | 13.8 | - |
| Pants up | 7 | 13.3 | 12 | 20.0 | 11.6 | 1.0 | 13.4 | 88 |
| Hat on | 2 | 20 | 3 | 22.5 | 20.7 | 1.0 | 22.5 | - |
| Zipper up | 5 | 0 | 5 | 28.6 | 12.8 | 1.2 | 28.6 | 100 |
| Shoe on | 1 | 0 | 1 | 9 | N/A | 0 | 6 | - |
| Clothing Off | | | | | | | | |
| Arms out | 4 | 22.3 | 4 | 38.5 | 11.9 | 1.5 | 38.3 | 100 |
| Coat off | 9 | 26.7 | 28 | 8.5 | 6.7 | .3 | 8.5 | 94.3 |
| Pants down | 5 | - | 9 | 18.3 | 19.7 | 1.2 | 11.4 | - |
| Pants off | 7 | 12.0 | 24 | 24.6 | 18.2 | 2.7 | 17.0 | - |
| Hat off | 3 | 0 | 3 | 23.3 | 2.9 | .33 | 23.3 | 100 |
| Zipper down | 6 | 6.3 | 6 | 25.3 | 9.9 | 1.5 | 27.0 | 95.0 |
| Shoe off | 2 | 20 | 6 | 5.0 | 0 | 0 | 3.0 | 100 |
| Washing hands, face | 12 | 34.6 | 26 | 12.2 | 9.5 | .5 | 12.2 | - |

the data for the programs involving removal of various types of clothing. Again, most of these skills were being learned quite rapidly except for arms out and zipper down. These two seemed to require more refined fine-motor skills and thus required a long period of acquisition. In each of these programs there were again few errors during the course of teaching the skills and the children's retention on review was quite high. Baseline figures also indicated the absence of the skills prior to teaching in most children's cases.

The final category in this table shows the data for washing hands and face and clearly indicates the rapid rate of learning the steps in this program (12.2 trials to criterion in an average of 12 days). Also, very few errors were made (average of .5 errors) during these programs. This data thus clearly indicates the children's learning abilities in this area in terms of acquiring the self-help skills and knowledge necessary for more independent functioning in addition to the clear demonstrations of the effects of the direct teaching procedure upon their acquisition of these skills. The children were quite clearly capable of acquiring a wide variety of dressing and personal hygiene skills through these teaching procedures and retain these skills over fairly long periods of time. In addition, they responded quite well to the toiletting program and the assistance and teaching for various eating skills. Although socialization skills weren't directly taught to the students, the teachers incorporated objectives in this area in the direct teaching of other areas such as group work on puzzles, etc., and they also incorporated socialization objectives into many incidental teaching situations.

### Incidental Teaching Model

The incidental teaching procedures, described in an earlier segment of the report, constituted one of the major methods of establishing generalization and elaboration of skills and knowledge the students acquired through direct teaching or on their own behalf. An incidental teaching framework was first elaborated as a decision-making model for spontaneous elaboration of language skills by Hart and Risley (1975). In their work, they develop a process whereby the teacher reacted to a child - initiated contact with communicative intent by using the opportunity to teach or elaborate a particular language construct; their work involved children with mild to moderate language deficiencies but not moderately/severely handicapped persons. The decision-making procedures they employed sufficiently resembled our direct teaching procedure, but in reverse order, that we adopted the procedure as our major generalization and elaboration process.

Hart and Risley (1975) confined themselves to situations in which the child-initiated contact with the adult, whereas we developed the approach to include parent/teacher initiated contact. A child-initiated situation occurs when the child indicates through word or gesture that he/she requires assistance; this process would be exemplified by struggling to disengage a zipper and gesturing to the teacher. If this level of interaction were suitable to the child, the teacher would praise the child for asking for aid and then help disengage the zipper. However, if the child could verbalize the request, the teacher would model the appropriate request, for example, "What do you want?", "(I) want help". If the child repeated the model and asked for assistance, the teacher would intervene, assisting with the zipper and praising asking for help. If the child continued to struggle with the zipper without a response, the teacher would intervene at this stage by repeating the question and pointing to the zipper. If the child still did not respond, the teacher would assist with the zipper without saying anything else. Thus, the children aren't discouraged from asking for help but it is important to use as many situations as possible for teaching purposes.

In the second situation, parent/teacher initiated contact, the child has not requested assistance but the parent/teacher has decided to use a particular situation to initiate new learning or to elaborate or generalize previously acquired material. In this instance the teacher/parent selects a particularly opportune moment to initiate a teaching trial. For example, sitting on the rug, the teacher approaches the child with a toy "a peg and some plastic rings" and says "Go ahead, put on __________, you put on!!" If the child responds appropriately, the teacher praises this and moves on; if not, the next step is employed. The teacher would repeat the instruction and point to the peg; if the child initiates the actions, praise ensues. If not, the teacher moves to the level of physically guiding the student through the actions required, then moving on to the next child. Thus, this procedure could be employed in many different situations in order to enhance, generalize, initiate new teaching of novel material. Parents, volunteers and practicum students could master this method with some ease and initiate the procedures quite well.

Incidental encounters are encouraged by placing the children's favorite toys behind a plexiglas screen and having the older children ask for their toys while the younger ones gesture or verbalize their wants or needs. In either case, immediate reinforcement ensues as the child obtains the desired toy very quickly. Thus, the environmental conditions facilitated the generalization of directly taught language skills. That is, the children generalized object labelling acquired in training and attempted to use these same skills to learn the labels of novel objects. At juice time, the children indicate their desires through language or gestures, depending upon acceptable levels of performance for the child. For example, a toddler asked "Duce", another pointed, whereas a pre-schooler must have said, "I want juice". During toiletting the children must indicate when they're finished, Danny pointed down while Wade said "Want down". These procedures can also be applied to motor development by encouraging and reinforcing activities such as lifting, push, a pull whenever something needs to be moved at home or school.

These and many other situations thus served as fertile territory for elaborating and generalizing these learned skills by the students. This procedure was extremely important in facilitating the generalization of skills and knowledge by the children in many areas. The use of a language rating system (Kysela and Hillyard, 1976) demonstrated the kinds of changes that the teachers could exert on the children's spontaneous language and the types of changes they could make in their own incidental teaching procedures when they were provided with feedback regarding their activities. Generally speaking, then, this procedure was extremely valuable in facilitating the generalization and elaboration of directly acquired skills.

### Summary

The behavioral data in the classroom aspect of the Early Education Project provides very significant information regarding the children's capabilities and the early intervention model's effectiveness. In the language instruction area, extensive gains were made with respect to initial verbal imitation training,early referential functions of language skills, self-initiated controlling aspects of language with others, and in some children's cases, extended functions including action referents and pronoun descriptions. Logical use of affirmative/negation indices were also acquired by seven children. Thus, extensive aspects of functional language were acquired by the children during the course of the project. In addition several areas of both comprehension and expression of language were expanded with the incidental teaching procedures (see Appendix D).

In the area of cognitive development, the children for the most part moved through the operations and operations with distractors programs enhancing their receptive language communication with adults and expanding their environmental exploratory skills. They learned several levels of self-identification and awareness and other-awareness through the body parts identification program. Stacking and puzzles programs resulted in more extensive participation in environmental activities as did the lacing programs. Through the writing and classification programs, the children were acquiring school-related basic skills. In the self-help areas, many dressing skills were mastered by the children as well as components of the personal hygiene skills (washing and drying), toiletting programs and eating skills programs. Thus, in all children's cases, progress was made in terms of many new skills and concepts being acquired; in addition, skills for surviving in the public schools were gradually being acquired. Five students from the pre-school classroom transfered to special programs in the public school system at the termination of the project.

The results provided two other major points. First, many programs required relatively few days to criterion and trials to criterion indicating the tremendous learning capacity the children have even with moderate to severe handicaps. In addition, the children maintained these skills and knowledge over several weeks of follow-up, supporting the notion that their memory processes were indeed effective. Secondly, very few errors occurred during the teaching programs in many cases due to the use of the extensive prompting and guidance procedures; this level of correct performance was maintained in several teaching areas even when the children were learning discriminative responses. Thus, it is clearly unnecessary to use negative or aversive procedures to obtain rather rapid learning of new skills and knowledge with children having moderate to severe handicaps.

## Normative Data

As Hanson (1975) has so aptly pointed out, the two crucial issues considered in the evaluation of early intervention specifically include investigating the relationship between the program's implementation and gains the children make or behaviors which are accelerated. The previous sections of the report regarding behavioral changes and their relationship to the early intervention per se demonstrated overwhelmingly the behavioral acceleration which occurred following the initiation of service. That is, ample evidence seemed to exist relating infant behavior changes functionally to the use of specific training procedures. In this section, data obtained from standardized normative tests will be used to demonstrate the effects of early intervention on the acceleration of the rate at which infants achieve developmental milestones. The rate of milestone attainment will be measured through the use of two sets of standardized, normative tests of development: the Bailey Infant Scales and the Stanford-Binet Intelligence Scale for mental development estimates and the Reynell Language Inventory for both receptive language comprehension and expressive language skills.

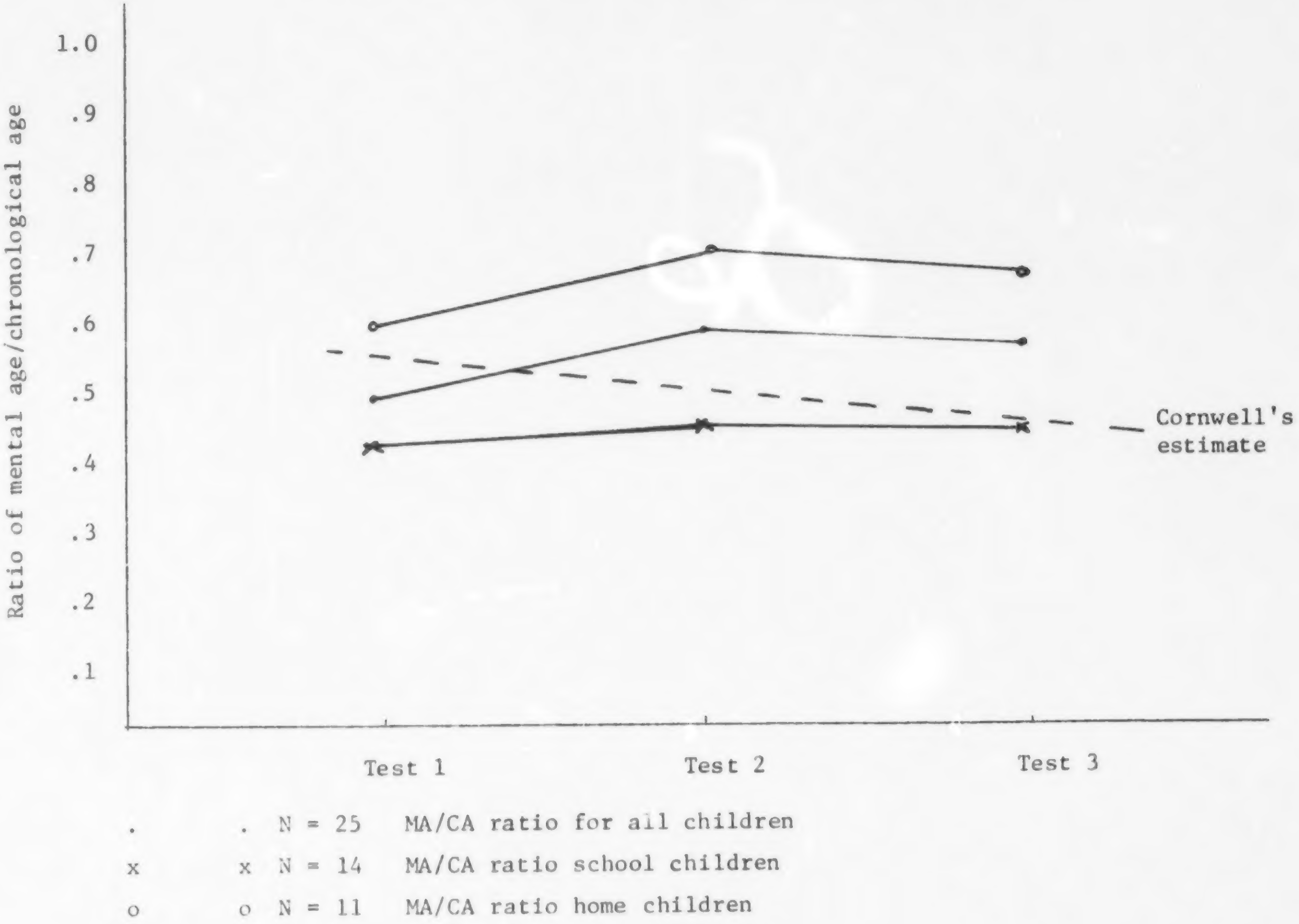
### Mental Development

Many authors have described the potential decrease in relative mental abilities with an increase in chronological age for children with moderate to severe mental retardation. This notion, described as the cumulative deficiency hypothesis, quite clearly suggests that as the retarded child grows, deficiencies accumulate one on the other, particularly in areas such as cognition and language where later complex skills and knowledge depend upon earlier learning. If early intervention programs are to have a major impact upon the handicapped child, this cumulative deficit must be reversed or at least stopped in order to accelerate the child's growth and development.

Figure 13 presents graphically the first three testings over 14 months for children in the project on the mental development scales. The raw data for all children in all the groups is provided in Appendix E. First in Figure 13, an estimated regression line is shown as a dotted line, adapted from data by Cornwell and Birch (1969), which shows the gradual decline in mental development obtained for children with Down's Syndrome. As can clearly be seen, in all three curves for the project, the trend is in the opposite positive direction. The graphs show the increase in the ratio of the children's mental age divided by their chronological age. This ratio score increases as the children's mental age approaches their chronological age (as they accelerate their rate of milestone achievement) and decreases as their mental age falls further behind their chronological age (cumulative deficits occurring).

FIGURE 13

MEAN VALUE OF MENTAL AGE, CHRONOLOGICAL AGE RATIO SCORES



Overall, as shown in the centre line, the children exhibited an increasing ratio of their mental age vs. their chronological age ($F = 6.52$, $p < .01$); this significant increase over the three testing periods is quite the reverse of the Cornwell regression line one would anticipate. This trend was consistent for both the home program shown in the upper line ($F = 5.39$, $p < .05$) and for the school-based program shown in the lower line ($F = 4.85$, $p < .05$). These data strongly support the reversing effects of early intervention in terms of the potential cumulative deficit in mental development which one would anticipate. In fact, the changes across the three testings exhibit a significant increase over the first 12 - 14 months of the project.

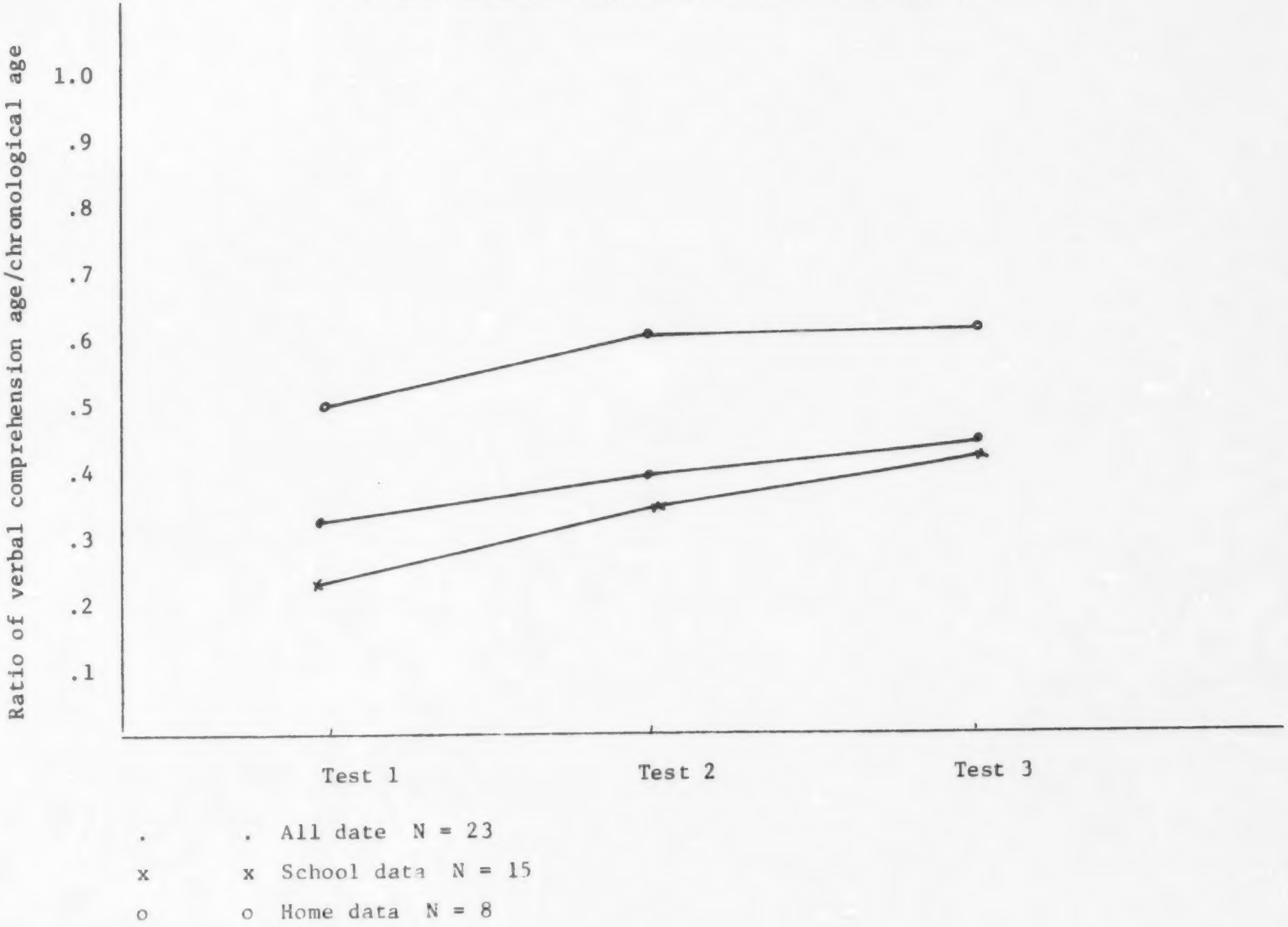
### Language Development

Although both the Zimmerman Language Scale and the Reynell Language Inventory were used with the children, the Zimmerman data was not employed due to the extravagant change scores yielded on this device. These large changes were the result of large gaps in the scale resulting in apparently large changes where only 1 or 2 new skills or concepts were acquired. The Reynell Language Scale seemed much more stable and realistic with respect to the changes in language skills exhibited by the children.

Figure 14 presents the results of the first three testing sessions over the first 14 months of the project for the ratio scores of the children's verbal comprehension age - equivalent scores divided by their chronological age at the time of testing.

## FIGURE 14

MEAN VALUES OF VERBAL COMPREHENSION/CHRONOLOGICAL AGE RATIO SCORES FOR ALL CHILDREN: SCHOOL AND HOME PROGRAM GROUPS

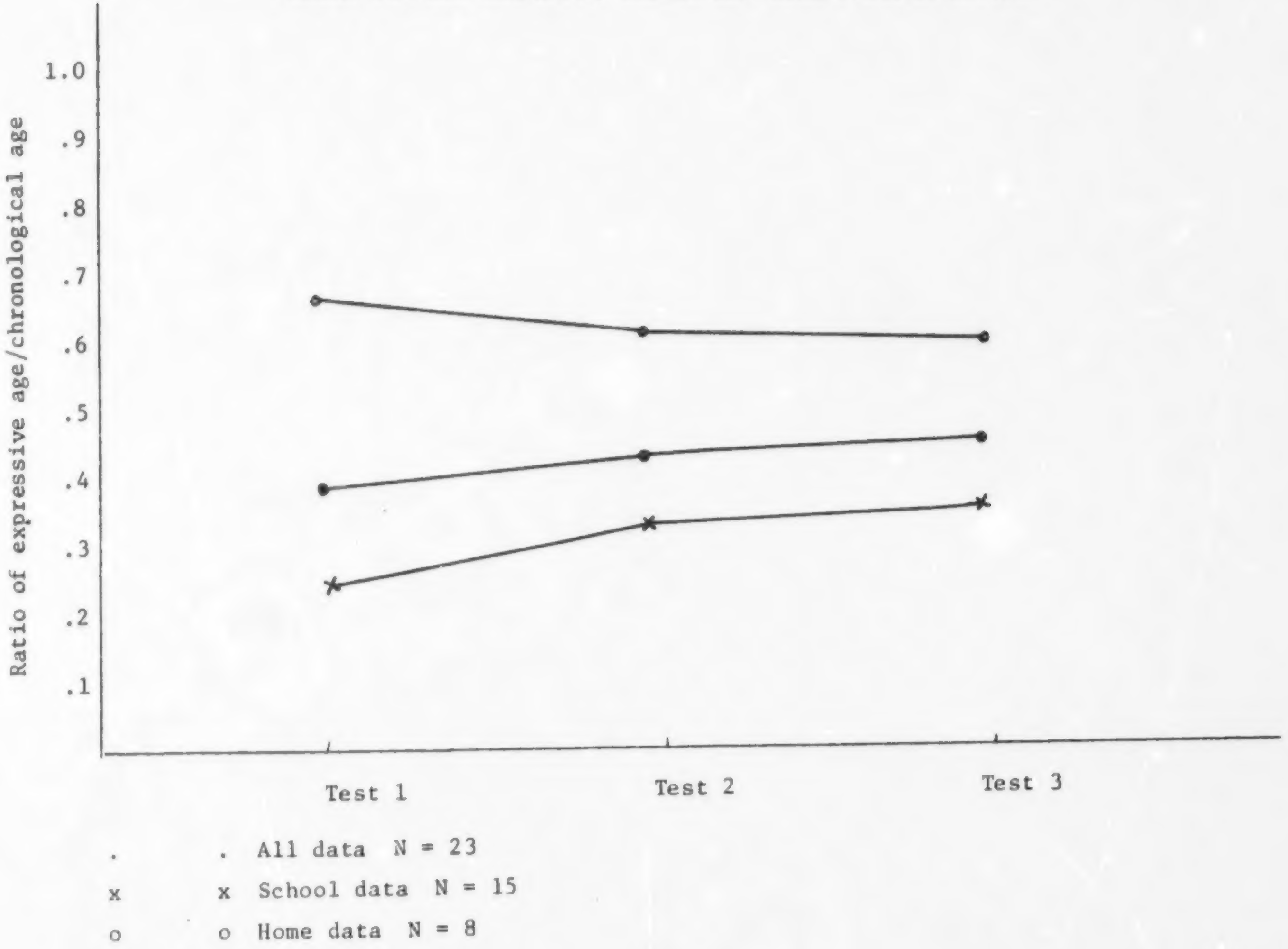


This ratio should increase as the verbal skills improve closer to normal and decrease as the child's chronological development increases faster than his/her language skill development. As is seen in the figure for the entire group (centre line), the children's receptive comprehension skills increased over these three testing periods ($F = 7.62$, $p < .01$). In addition, significant changes occurred for the children in the school program ($F = 15.47$, $p < .01$) (see bottom line). Although the change for the children in the home program (from $\bar{x}_1 = .52$ to $\bar{x}_3 = .62$) was not significant ($F = .70$), this change reflected a modest increase and not a decrease in the comprehension skills for these children maintaining an accelerated rate of development of these skills.

Figure 15 presents these ratio scores across the first three testings for the expressive language skills measured on the Reynell Language Scale. As can be seen in the figure, overall, there was a slight increase in these ratio scores indicating slightly accelerated rate of acquisition ($F = 2.29$, $p > .05$), although the change did not reach statistical significance.
However, the school group (shown in the lower line) did exhibit significant change in an upward direction in these ratio scores ($F = 10.83$ $p < .01$), indicating an accelerated rate of acquisition of these skills for them. The change for the home program children was not significant ($F = .64$), but indicates a maintenance of learning these skills across a 14 month period of early intervention. Many children in the home program were just

## FIGURE 15

MEAN VALUES OF EXPRESSIVE LANGUAGE AGE/CHRONOLOGICAL AGE RATIO SCORES FOR ALL CHILDREN, SCHOOL AND HOME PROGRAM GROUPS



beginning more elaborate speech patterns as the project ended so perhaps a future assessment of their skills would show an improvement in acquisition in this area. Although some children were assessed a fourth time, this data was not presented due to the limited number of subjects available for comparison purposes. Secondly, some limited data on motor development was available. However, since many children had to be assessed with another test on the second and third testings, this data is not presented. But, for 11 children in the home program tested three times with the Bailey Infant Scales, their average ratio to physical development age equivalent change vs. chronological age was .56 at Test 1 and .47 at Test 2 for the 12 - 14 month interval of time. This fact demonstrates that for these few children motor development was not being accelerated at the same rate as was cognitive with language development. However, these changes were not available for all subjects and thus preclude firm conclusions from being made regarding this area of development.

In summary, the normative data overall indicated a significant increase, for most cases, in the acceleration of the rate of achievement of developmental milestones. In those cases where significant increases weren't shown, there was a maintenance of the initial levels of growth rate exhibited at the project initiation. These findings demonstrated the positive impact of this early intervention program on the cumulative deficiency problem, in which this process was reversed significantly in several areas of development and eliminated in expressive language over the course of program intervention.

## External Evaluation

During the course of the project's 20 month operation, an external evaluation was conducted by Dr. Richard Schiefelbusch from the University of Kansas Bureau of Child Research. He was supplied with an extensive description of the project and spent two days on a site visit with the staff of the program reviewing procedures and data. His report is contained in Table 27 which is a reproduction of his letter following the site visit. One rather notable feature of the report is the need for a demonstration and research centre to continue the type of research efforts initiated by the project in early intervention and the development of programs and materials associated with these efforts.

## Per Diem Costs

The project was provided with a budget of $223,000. from November 1, 1975 to June 30, 1977. During this 20 month period 47 children participated in the home-based parent training early intervention program and the toddler and pre-school classrooms of the school-based early intervention program. Thus, this 20 month period yields 400 days of instruction. The per diem cost estimates based on these figures are $11.86 per child; this cost seems to compare quite favorably to the commonly estimated cost of at least $50. per day per child to provide services in an institutional setting. However, this cost does not include transportation costs for bringing the 21 students who participated in the school program to school. At $5.00 per day per child, this could have been $42,000. for the 20 month period. Handicapped Children's Services provided for these transportation services along with cost-sharing by the children's parents. It should be pointed out that the total amount included the research and development costs but did not include specialists in speech pathology and physiotherapy nor such expenses as substitute teachers or transportation. More recent expenses indicate a figure close to $15./child/day is a more realistic estimate.

TABLE 26

THE UNIVERSITY OF KANSAS · LAWRENCE, KANSAS · 66045

BUREAU OF CHILD RESEARCH

913-864-4295

April 1, 1977

MEMORANDUM

TO: Dr. Maria Carey
Dr. Gerard Kysela

FROM: Dr. R. L Schiefelbusch

Re: Consultation Visit to the Early Childhood Project

This is an evaluation statement based upon my reading of project materials, attendance at the project staff poster session at the Banff Conference on Behavior Modification and my visit at the project setting. There is one other feature that preceded my coming to Banff and Edmonton. I checked out the written project plans with members of the Kansas setting who are doing infant and preschool projects here. All of these dimensions of evaluation figure in the following comments.

I should acknowledge at the outset, of course, that I have not had access to the bulk of the data showing results of your project. My understanding however, is that the preliminary data at your disposal is reassuring. Nevertheless, my comments will be directed at the program content and sequence; the teaching model; staff training qualification and effectiveness and general impressions and recommendations.

Program Content and Sequence

The early childhood project is an intervention program for toddler and preschool children with moderate to severe developmental handicaps. The school-based portion of the program provides instruction in early childhood skills and knowledge. This is combined with a home-based training program with infant teaching learning intervention systems as the primary focus. The program employs a developmental task analyzed curriculum with a criterion referenced assessment method to determine the child's competencies and skills. The goals for intervention are identified in behavioral terms.

Five areas of development are featured in the curriculum. These include cognition, self help, motor, language and socialization. Terminal objectives and sub-skills are identified for each of these areas. In specifying a criterion referenced assessment procedure the staff demonstrate an attempt to assess the child and to determine progress as measured against the child's own performance index. This is somewhat different from a normative reference procedure where the children are compared against an hypothetical normal standard. These criterion referenced procedures then include a test-teach method which allows for the maintenance of a sequential program that includes probes and guidance assessments of the children's skills throughout the

TABLE 26 (CONT.)

program. This level of remedial input allows for the determination at all times of the level of the child's responding and subsequent progress.

The five areas of curricular emphasis are implemented by using the best designed procedures that this evaluator has been able to find, in fact I marvel that they have been able to pinpoint and to contract child and toddler researchers in many sections of the United States and Canada and to seek permission to use their best materials as soon as they are available. The staff also remains in contact with such programs and are able to secure a great deal of informal assistance in implementing the work and in combining it into a workable model to further their project aims. I can say categorically that it is as well designed toddler and preschool program as I have found in any of my visits to leading early child centers in the United States.

## The Teaching Model

Their teaching model includes test-teach methods for direct and incidental instruction designed to provide an instructional format for teaching, maintaining, and elaborating new skills and concepts. Both parents and teachers are taught to employ these methods to teach and maintain new behaviors following specific identification of the teaching goals. Each child's progress is monitored through the use of a standard data collection format allowing full behavioral analysis of the effects of intervention. The data collection procedures both for the classroom and home follow the same standard format that allows data to be compared in terms of effectiveness in both settings. It is possible for them thus to pinpoint the effectiveness of their instructions to teachers and parents and the effects of the training sequences as carried out in both settings.

## Staff Training Qualification and Effectiveness

During my visit to the project setting I was continually impressed with the high morale of the staff and with their enthusiasm for the project. Each member seemed to be quite clear about the purposes, the plans and the effectiveness of the program. Each member also seemed to have a clear professional design for their own role and work. In general the discussion with staff members was reassuring and suggests both confidence and stability for further project development.

## General Impressions and Recommendations

My general impressions are that the project staff has made a great deal of progress in a very short time. They have put together an impressive plan for project development and instruction. Staff members have been

**TABLE 26 (CONT.)**

trained and substantial progress has been made in devising technical means for collecting data and for assessing project effectiveness. The project now stands at an important juncture in its development. If staff members are given further assurance that additional support will be available they can lay out further plans for effective project development. This would include further plans for data collection and project refinement down to specific components of the overall plan. These refinements can be used for training others who might want to implement the project in other settings. The project should also be used as a demonstration setting, a place where other potential project developers and staff members can be trained--as a place where instructional staff can combine their roles with the project staff and can develop their roles as trainers and as field works providing technical assistance to other programs. The demonstration setting should also be used in a continuing way to develop instructions for project activities that can be used in the field. This would be a complete set of instructional procedures for each step in the program and each procedure should be used in working with the children and in collecting data about progress. I would strongly urge that the project be viewed as a resource which should be maintained and utilized in developing other programs throughout the province.

So far I have not mentioned individuals, however it should be clear that the leadership provided by Dr. Kysela and the competence of other staff members including Kathleen Daley, Martha Doxey-Whitfield, Alex Hillyard, Linda McDonald, Susan McDonald, and Julie Taylor are all strong assets in the project. If possible funds should be provided for them to continue and to further develop their roles.

RLS:mbj

# CONCLUSIONS

## Discussion of Results

The results of this project have provided essential data with respect to two very important dimensions of early intervention. First, the normative data indicated that the children's rate of achieving developmental milestones was significantly accelerated in mental development and language areas for the school program and in the area of mental development for the home program. In addition, the rate of development exhibited by the children in the home program was maintained in moderately increased language development. These results reflect the extensive impact of the early intervention program on the children's development, reversing the typical cumulative deficit normally exhibited by moderately to severely handicapped children. One reason for the large gains shown in the school population was their initial very low starting point, the result of the cumulative deficiencies over the first three to four years of their lives without any intervention.

Secondly, the behavioral data demonstrated the profound and rapid increases in knowledge and skills which can be attained by moderate to severely handicapped children when provided with early intervention and direct teaching of these skills and knowledge. An additional feature of this data is the very limited number of errors which results from the teaching model used, thus optimizing the positive learning experiences the children had, whether taught at home by mother and the other members of the family or by teachers in a school classroom for 2½ hours per day. A final crucial facet of this data is the reassuring findings that the children retain these new skills and knowledge long after cessation of direct teaching. Thus, these extensive data suggest we should be very optimistic about the extensive gains children will exhibit if they are taught through direct teaching procedures. The use of a data-based system of instruction insured the capacity to individually tailor and modify programs to suit individual children's needs and idiosyncrasies. This aspect seems most critical if systematic programs are to be employed which are sensitive to individual children and families.

Several experimental studies demonstrated the specific effects of the intervention procedures (especially the direct teaching procedures) on the children's acquisition of new skills. Although much additional research is needed regarding the effects of the direct teaching approach,sufficient data exists now supporting the efficacy of these procedures in teaching new skills and knowledge to the moderate to severely handicapped child. Of particular significance, this model was effective with all four areas of instruction: language skills ; cognitive development ; self-help skills ; and motor development.

The use of parents as the primary teachers in the home-based parent early intervention program and the extensive gains made by the infants as a result of this intervention strongly supports the use of a home-based aspect of the project for children as soon as the handicapping condition is identified. The importance of this early intervention cannot be emphasized strongly enough. As was seen in the behavioral data many of the same programs were being taught to children in the home program (average age of 12 months) as were being taught to the school-based children (average age of 34 months at start of project). Thus the earlier the intervention is initiated, the more rapid the learning of these skills and knowledge.

A final conclusory point regards the effective teaching skills of the home teachers and the teachers and developmental assistants in the school program. These persons were able to develop and implement the many skills required to assess and teach children (and parents in the home program) the many and varied skills and knowledge covered in the curriculum. This fact attests to the great capacity of the personnel to learn new skills and techniques for early intervention and to implement these new methods to enhance the developmental growth of handicapped children.

## Limitations

Although in the final analysis, one could identify many limitations to this investigation, probably only two are of sufficient significance to warrant mention. First, this project did not have a control group of children with which to compare the participating children's growth and development. Thus, although extensive changes occurred in both normative development and the acquisition of new skills and knowledge which appear to be due to the early intervention program and seem to be contrary to the expected cumulative deficiency hypothesis, a true experimental demonstration of this fact was not possible without the control group.

Secondly, the children involved all exhibited some degree of developmental delay from mild to severe, although most of the children had Down's Syndrome as well as other handicapping conditions. However, the inclusion of a broader sample of children would have enhanced the generality of the findings to the full range of mentally retarded and developmentally delayed children. This problem should be remedied in the future with attempted applications to other children with severe and profound handicapping conditions.

## RECOMMENDATIONS

### Future Programs

Of particular importance in drawing out recommendations from this project is the premise that for exceptional children it has not been clear precisely how to intervene in the process of development to maximize the child's growth and learning. The substantive results of this project have shed some considerable light upon this dilemma. First and foremost, the normative data demonstrate the significant impact early intervention can have upon mental development generally and receptive and expressive language specifically with moderately to severely handicapped persons. This data was most striking in showing an acceleration of development in these areas over the first 12 - 15 months of intervention. Thus, a first recommendation is to continue early intervention at home or in a school-based program as soon as the child's handicaps are identified.

Secondly, the behavioral data yield a number of specific recommendations regarding the process of intervention. Direct testing and teaching of the children with the criterion-referenced assessment procedure and the direct teaching method resulted in rapid indications of competence and the use of a very positive teaching approach. Thus, it is recommended that these procedures should be employed as the primary means of providing the early intervention to enhance the child's development.

Third, the developmental curriculum and standard program format insured objective identification of skills and knowledge to be acquired and methods for teaching the children. Thus, these procedures should continue as the primary types of competency sequences and teaching materials for this direct early intervention.

Fourth, the data collection system provided the input regarding children's progress and teaching success, thus insuring a responsive teaching environment for the children. This procedure should continue to ensure that the programs are adapted and changed to reflect the rate of progress individual children exhibit and to more personally tailor the teaching procedures to a child's growth rate.

Fifth, the incidental teaching procedures were extremely valuable for generalizing skills and knowledge children acquired, by parents as well as teachers and volunteers. Thus far, procedures should continue to be used for the essential generalization experiences children need in order to apply their knowledge more extensively.

Sixth, data from the home teacher's parent training program indicates the need to formalize the parent training process into a sequence of steps gradually teaching the parents how to teach their children. The necessity of a gradually more complex series of units providing parents of handicapped infants with these skills and knowledge was quite clear from the results of the training process. Many if not all of the home program families also indicated the value of the home program and the importance they felt in starting early and starting at home. The data shown in the section on results of home teaching strongly supports their contention, showing for example the home children learning as rapidly as the older children in the school-based programs many of the very same language and cognitive skills and knowledge. Thus, it is recommended that future early intervention programs begin as soon after birth as is possible with a strong home program utilizing home visits on a weekly or bi-weekly basis. This phase should be followed by a school-based program for children from 2 years (or at that age parents wish to begin) to 5½ years, ensuring not only continued developmental enhancement but also preparation for more successful experiences in elementary school programs.

Seventh, in conjunction with the above points, it is recommended that a series of staff training and instructional modules be completed providing the skills and knowledge required to serve teachers and assistants in this type of early intervention. This recommendation results from the experiences of training several (10) persons for this project as well as attempting to train persons at a distance (Peace River, Alberta and Lethbridge, Alberta) to implement a similar program. That is, these staff training modules should provide for the acquisition of competencies in criterion-referenced assessment, direct and incidental teaching, program development, data collection systems, and task analysis skills. These skills should be employed for teaching 1 - 1, 1 - 4, and 1 - 7 ratios of teacher-student groupings of infants and toddlers. Home teachers required additional training in parent consultation and advisement due to the extensive contact with families especially soon after the birth of a handicapped child. This area of instruction may also include initial exposure to issues in the area of family counselling.

During the course of the project the home teachers carried caseloads of from six to fourteen families, thus providing experience regarding different levels of caseload for this type of early intervention. The results of these experiences indicate that a caseload of approximately ten or eleven families would be a maximum for weekly or bi-weekly visits. With a great number of bi-weekly visits, this number could be raised proportionately.

A further recommendation related to parental participation stems from our experiences in the school program. The parents should be required, whenever possible, to visit once every two weeks to work as a volunteer, participate in parent training sessions to learn direct and incidental teaching skills, and be provided with monthly records of the children's gains; also bi-monthly home visits from the teachers proved to be very useful for ensuring carry-over to home of the skills learned in school. Thus, the ratio of teachers and assistants to children should not exceed 2/8 ensuring that these facets of the program can be maintained. The school location should continue to be in a normal elementary school housing other Early Childhood Services Programs to ensure the continuation of normalizing experiences in conjunction with the educational program. The library of books developed through the Kinette's donation should be maintained and developed as a resource to the project.

Funding was provided through the Department of Education, Early Childhood Services Branch. In the future, more extensive funding should include Early Childhood Services as well as Services for the Handicapped and the Public School Board with other possible sources also being sought out.

Due to the extensive language delays and motor skill impairments the children exhibit, professionals such as speech therapists and physiotherapists should be obtained from the budget of the project; this service is particularly essential as these areas of teaching need continuing evaluation, modification, and coordination with the child's total program.

A final recommendation is that transportation should continue to involve the Edmonton Handibus Services and be funded collectively by the operating budget of the program with assistance from the school board and the parents for all children in the program.

## Future Developments and Research

In an investigation of this magnitude, innumerable research and development ideas are encountered in the process: this section of the report attempts to highlight investigable problems encountered during the implementation of the early intervention approach which pertain more or less directly to the effects of this process. The first area of study involves the formal development and validation of the staff training program. This set of staff training sequences should be formalized for use with others in this field who wish to take the same approach to providing early intervention.

The validation of this instructional material in terms of its effects upon skill and knowledge acquisition by the potential teachers would be a necessary prerequisite to the broader dissemination of the methods. In conjunction with this effort, the parent training manual should also be completed for use by staff trained in the methods of direct early intervention. The parent training sequence employing a series of increasingly complex units instructing parents on the methods and procedures of home teaching was developed with the Early Education Project but requires validation and completion. This aspect of continuing development would be essential if others intend to continue the program in other places of Alberta.

The developmental curriculum and the criterion-referenced assessment procedure which accompanies the curriculum require further validation. Madill (1977) has partially validated the sequence of motor objectives from early head movements through to walking in terms of the ordinality of this scale. However, extensive additional research of this type is required to develop this valuable resource for establishing teaching objectives.

During the course of the project, two quite different approaches to teaching, the direct teaching model and the incidental teaching model, were applied to the problem of early intervention. To the author's knowledge, this project was the first instance of the conjoint use of these two approaches with infants and young children. Further investigations of the relationship between these two methods is necessary to delineate their strengths and weaknesses and to clarify the manner through which they amplify, compliment, and possibly conflict with each other. For example, it's quite possible that language skills are more efficiently acquired through incidental methods whereas self-help skills are more effectively acquired through direct teaching processes. These and other questions regarding the teaching models require answers prior to further elaboration or use of them in a wider context.

A final very important area of future research is the further study of acquisition, retention, and generalization of knowledge and skills by the children with moderate to severe handicaps. The data from the project clearly demonstrated the rapid and enduring learning patterns the children exhibited during the course of the project. More detailed investigations are required to identify the scope and depth of learning possible by the children. Their extensive retention of the learned skills and concepts also suggests a lack of memory problems which is surprising for children with this degree of retardation. Also, the question of generalizing these newly acquired skills to their natural environments requires much additional information regarding the best procedures and optimal outcomes. Each of these areas thus encompasses major researchable problems regarding the mentally handicapped child's learning processes and requires further investigative efforts.

A final statement for the report must include a comment to future practitioners and researchers in this field. The problems of early intervention are indeed varied, complex and at times appear insoluble. However, diligence will be rewarded with solutions in time while the hard, hard efforts of pursuit of new knowledge are constantly being rewarded by the beautiful attainments of the developing children for whom the effort is being made in the first instance.

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# APPENDIX A

## Criterion Referenced Assessment Guide

in Cognition
Motor Development
Language
Self-Help Skills

First Draft. Those interested in reproducing copies should first consult with Dr. G.M. Kysela, C.S.M.R., University of Alberta, Edmonton, Alberta T6G 2E1.

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# Criterion Referenced Assessment Guide

## Language Objectives

### Pre-Linguistic and Early Language Objectives

1. Attention

| | 1 | 2 | 3 |
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A. Child will look at E. face when given the attending signal "______Look Here" or "Look at Me ______" within 5 seconds of the command. Child will look at the E. on 2 out of 3 trials.

1. Child will turn his head, move quickly, or cry in response to a loud noise. (Portage #3)
2. Child will show, by moving eyes and head, or body, that he hears a voice or soft noise. (Portage #6).
3. Child will turn his head, smile, cry, or move his body toward or away from a person talking. (Portage #4)
4. Child will turn his eyes and head in direction of a voice or noise. (Portage #5)
5. Child will smile and/or move his body toward friendly voices. He will make withdrawal movements and will not make positive facial gestures and will cry in response to an angry voice. (Portage #7).
6. Child will indicate by a change in body position, eye movement, or motion that he recognizes his name. (Portage #10).
7. Child will stop a movement in response to "NO" (Portage #14).

## Definitions

### Attention

1. When a rattle is sounded loudly at the side of the childs head he will turn his head in the direction of the sound or cry as a result of the noise. On 2 out of 3 trials the child will react to the sound of the rattle by demonstrating any of the three reactions above within 5 seconds of the presentation of the auditory stimulus. (L-3)

2. When a rattle is sounded softly at the side of the childs head he will indicate by moving eyes and head, or body that he has heard the sound. The E. will make all sounds with the rattle out of the childs peripheral vision. The child will respond to the rattle sound demonstrating any of the reactions described within 5 seconds of the presentation of the auditory stimulus and on 2 out of 3 trials. (L-6)

3. When the E. approaches the child from behind the child will react to him as he becomes visible by either turning head, crying or moving body forward or away from E. within 5 seconds of the E. approach and on 2 out of 3 trials. (L-4)

4. The child will turn his eyes and head in the direction of a rattle which the E. shakes behind his head. The E. will alternate the sound by moving the rattle from behind to the side making sure that the rattle is at no time visible to the child. The child will react to the auditory stimulus within 5 seconds of the presentation and on 2 out of 3 trials. (L-5)

5. The child will smile and/or move parts of his body toward the friendly voice of the E. who will call his name and smile at the child. The child will not make positive facial expression or gestures in response to the angry voice of the E. who will say "NO". The child will respond to the voice tones described within 5 seconds of the commands and on 2 out of 3 trials. (L-7)

6. The child will indicate by a change in body position, eye movements or motion that he recognizes his name when E. calls the childs name while sitting beside him on the floor. The E. will not show any facial expression when calling the name. The child will demonstrate any of the 3 variations above within 5 seconds of the command and on 2 out of 3 trials. (L-10)

7. Presented with a rattle or another toy, the child will not play with the object when given the command "NO" (shouted loudly). The child will stop playing with the object immediately after the loudly, shouted command for at least a 1 second interval on 2 out of 3 trials. (L-14)

Imitation (See Skill Test)

Gross Motor Sounds/Sounds and Action

1. Child will imitate E. model within 5 seconds for gross motor behavior and 2 sounds.

Sounds and Words

2. Child will imitate E. model within 5 seconds for sounds and 2 words.

Words

3. Child will imitate 16 one and two syllable words within 5 seconds of the model "Say ________".

## Persons and Things

1. Labeling

Child achieves 80% or more correct responses in a session of 32 trials or 12 correct responses in a row when asked "Whats that?" and presented with the following 16 stimuli singly: cookie, pants, ball, nose, chair, pop, shoe, car, tummy, table, apple, cup, top, mouth, spoon, drum. See Skill Test I Guess et al. (P18)

Guess et al. Step 1

2. Point To

Child will identify by pointing or by giving the E. a named item achieving 80% or more correct responses in a session of 32 trials or 12 correct responses in a row when instructed "Point to the (item)" or "Give me (item)" or (item)?" and presented with four items at a time from the list of sixteen items in Step one. See Skill Test 2, Guess et al. (P29).

Guess et al. Step 2

3. Requesting Items

Child will request items using a two-word response ("Want (item)") achieving 80% or more correct responses in a session of 32 trials or 12 correct responses in a row when asked "What want?" and presented with ten items singly. These items are foods, liquids, toys, etc. that are reinforcing to the student and which he is able to label.

Guess et al. Step 3

4. Asking ("Whats That?")

Using at least ten items which he can label plus a large assortment of items for which he probably does not know the labels, the child will ask "What's that?" when confronted with items for which he does not know the label achieving 80% or more correct responses in a session of 32 trials or 12 correct responses in a row.

Guess et al. Step 4

5. Acquiring New Object Names

Using six items he can label and six novel items, the child will ask "What's that?" when he does not know the label of an item presented and will supply the label when he does know it achieving 80% or more correct responses in total responses per session or 12 consecutive correct responses for a session.

Guess et al. Step 5

6. Memory For New Item Labels

Using six to ten novel items and three items he can already label, the child will ask the question "What's that?" when presented with novel items and will then correctly label these previously novel items dropping the question "What's that?" for that particular item and successfully label three novel items within two training sessions.

Guess et al. Step 6

7. Idenficication of Labels using "Yes" and "No"

Using sixteen items he can already label easily and accurately, the child will answer "yes" when asked "Is this a (item)?" and presented with an item matching the verbal label and will answer "no" when asked "Is this a (item)?" and presented with an item not matching the verbal label. He will achieve 80% or more correct responses in a session of 32 trials or 12 correct responses in a row.
See Skill Test, Guess et al (P30)

Guess et al. Step 7

8. Requesting Items with "I"

Using the items that are especially liked by the student he will use a three-worded response "I want (item)" achieving 80% or more correct responses in a 32 trial session, or 12 consecutive correct responses, when requesting items in responses to the question "What do you want?"

Guess et al. Step 8

9. Naming and Requesting Items

When presented with an item and asked "What is that?" the child will provide the correct label. His request for item in response to the question "What do you want?", presented immediately, will be a three-worded response "I want (item)". Where both questions are presented, the child will respond correctly to both on 80% or more trials in a 32 trial session or on 12 consecutive trials.

Guess et al. Step 9

| BASELINE DATA FOR VERBAL IMITATION<br>Date Began: __________<br>Scoring Key<br>+ Correct<br>- Incorrect | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | Percentage Correct |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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# Skill Test Scoring Form for Step 1

Student ______________________ Date __________________ Session # ______

Trainer ______________________

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In blanks 1-16, list the 16 items that are used in Step 1; then list them again (not in the same order) in blanks 17-32.

| | Item | Score | | Item | Score |
|---|---|---|---|---|---|
| 1. | | | 17. | | |
| 2. | | | 18. | | |
| 3. | | | 19. | | |
| 4. | | | 20. | | |
| 5. | | | 21. | | |
| 6. | | | 22. | | |
| 7. | | | 23. | | |
| 8. | | | 24. | | |
| 9. | | | 25. | | |
| 10. | | | 26. | | |
| 11. | | | 27. | | |
| 12. | | | 28. | | |
| 13. | | | 29. | | |
| 14. | | | 30. | | |
| 15. | | | 31. | | |
| 16. | | | 32. | | |

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Score trials as correct (+): incorrect (-); shape (S); or no response (NR)

Percent Summary for Test (Based on 32 Trials)

| | + | - | S | NR |
|---|---|---|---|---|
| Score | | | | |
| Percent | | | | |

## Skill Test Scoring Form for Step 2

Student____________________ Date____________________ Session #______

Trainer ____________________

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List the 16 items (twice) that are used for training in Step 2

| | Item | Score | | Item | Score |
|---|---|---|---|---|---|
| 1. | | | 17. | | |
| 2. | | | 18. | | |
| 3. | | | 19. | | |
| 4. | | | 20. | | |
| 5. | | | 21. | | |
| 6. | | | 22. | | |
| 7. | | | 23. | | |
| 8. | | | 24. | | |
| 9. | | | 25. | | |
| 10. | | | 26. | | |
| 11. | | | 27. | | |
| 12. | | | 28. | | |
| 13. | | | 29. | | |
| 14. | | | 30. | | |
| 15. | | | 31. | | |
| 16. | | | 32. | | |

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Score trials as correct (+); incorrect (-); shape (S); or no response (NR)

Percent Summary for Test (based on 32 trials)

| | + | - | S | NR |
|---|---|---|---|---|
| Score | | | | |
| Percent | | | | |

## Skill Test Scoring Form for Step 7

Student ______________________________ Date ____________________ Session #___

Trainer ______________________________

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The items listed on this and subsequent scoring forms are intended to serve as examples. The Trainer is free to select training items which best meet the individual needs of the students, based upon their abilities to accurately label the objects. The items used in numbers 1-16 again repeated in numbers 17-32 even though the order of presentation has been randomized. Remember that criterion performance is based on all 32 trials.

| Show this Object | Ask | Score | Show this Object | Ask |
|---|---|---|---|---|
| 1. ball | IS THIS A BALL? | ____ | 17. chair | IS THIS A CHAIR? |
| 2. hat | IS THIS A ____? | ____ | 18. table | IS THIS A ____? |
| 3. cup | IS THIS A ____? | ____ | 19. block | IS THIS A ____? |
| 4. apple | IS THIS AN APPLE? | ____ | 20. soap | IS THIS SOAP? |
| 5. car | IS THIS A ____? | ____ | 21. pencil | IS THIS A ____? |
| 6. cookie | IS THIS A COOKIE? | ____ | 22. ring | IS THIS A RING? |
| 7. pencil | IS THIS A PENCIL? | ____ | 23. sock | IS THIS A SOCK? |
| 8. gun | IS THIS A GUN? | ____ | 24. hat | IS THIS A HAT? |
| 9. sock | IS THIS A ____? | ____ | 25. comb | IS THIS A ____? |
| 10. table | IS THIS A TABLE? | ____ | 26. ball | IS THIS A ____? |
| 11. ring | IS THIS A ____? | ____ | 27. gun | IS THIS A ____? |
| 12. chair | IS THIS A ____? | ____ | 28. car | IS THIS A CAR? |
| 13. block | IS THIS A BLOCK? | ____ | 29. cookie | IS THIS A ____? |
| 14. spoon | IS THIS A ____? | ____ | 30. spoon | IS THIS A SPOON? |
| 15. soap | IS THIS A ____? | ____ | 31. apple | IS THIS A SOCK? |
| 16. comb | IS THIS A COMB? | ____ | 32. cup | IS THIS A CUP? |

Score trials as correct (+); incorrect (-); shape (S); or no response (NR)

Percent Summary for Session

| | | | | |
|---|---|---|---|---|
| Score | | | | |
| Percent | | | | |

## Actions with Persons and Things

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|---|---|
| When asked "What you do?" child responds "I (verb)"<br>When asked "What you want." child responds "I want (Object)". | Guess et al. Step 10 |
| When asked "What you do?" child responds "I (verb) (label)"<br>When asked "What you want?" child responds "I want (object)". | Guess et al. Step 11 |
| When asked "You (verb) (label)?", child responds "yes" or "no". | Guess et al. Step 12 |
| When asked "What I do?" child responds, "You (verb)" | Guess et al. Step 13 |
| When asked "What I do?" child responds "You (verb) (label)". | Guess et al. Step 14 |
| When asked "What do you want?" child responds when asked "I want (object)".<br>When asked "What (am/are) (I/you) doing?" child responds "(I) (you) (verb) (label)" | Guess et al. Step 15 |
| When asked "What do you want to do?" child responds "I want (verb). | Guess et al. Step 16 |
| When asked "Do you want to (verb)?", child responds "yes" or "no". | Guess et al. Step 17 |
| When asked "What do you want to do?", child responds "I want (verb) (object)". | Guess et al. Step 18 |
| When asked "Do you want to (verb) (object)?", child responds "yes" or "no". | Guess et al. Step 19 |
| When asked "What do you want me to do?", child responds "I want you (verb). | Guess et al. Step 20 |

| | |
|---|---|
| When asked "Do you want me to (verb)?", child responds "yes" or "no". | Guess et al. Step 21 |
| When asked "What do you want me to do?", child responds "I want you (verb) (object)". | Guess et al. Step 22 |
| When asked "Do you want me (verb) (object), child responds "yes" or "no". | Guess et al. Step 23 |
| When asked "What do you want to do?", child responds "I want (verb) (object)".<br>When asked "What do you want me to do?" child responds "I want you (verb) (object)". | Guess et al. Step 24 |
| When asked "What are you doing?", child responds "I want (verb) (label)" | Guess et al. Step 25 |
| When asked "Am I (verb) (label)?", child responds "yes" or "no". | Guess et al. Step 26 |
| When shown a new verb-action, child asks "What you do?" | Guess et al. Step 27 |
| When shown a new verb-action and asked "What are you doing?", child responds "I (am) (verb) (object)"<br>When asked "What am I doing", child responds "You (verb) (object). | Guess et al. Step 28 |
| When presented with a mix of old and different new actions, child responds "What you do?" or "You (verb) (label)". | Guess et al. Step 29 |

## Possession and Color Description

| | |
|---|---|
| When asked "Whose (label)?" child responds "(My) (your) (label)" | Guess et al. Step 30 |
| When asked "Is that (my/your) (label)?", child will respond "yes" or "no". | Guess et al. Step 31 |
| When asked "What you want do?", child responds I want (verb) (my/your) (label)". | Guess et al. Step 32 |
| When asked "Whose (object)?" child will respond "That is my (object)" or "that is your (object)". | Guess et al. Step 33 |
| When shown new objects, child responds "That is (my/your) (label)?" | Guess et al. Step 34 |
| When asked "That is (my/your) (object) (label) "What do you want?", child responds "I want (my/your) object" When asked "What are you doing?", child responds "I (verb) my/your (object)" | Guess et al. Step 35 |
| When shown a mix of Red/Blue/Yellow objects and asked what is it?", child responds "red/blue/yellow (object)" | Guess et al. Step 36 |
| When asked "Show me the red/blue/yellow (object)", child responds by correct pointing. | Guess et al. Step 37 |
| When asked "Where is the (object)?" red/blue/yellow box, "What do you want to do?", child will respond "I want open red/blue/yellow box". | Guess et al. Step 38 |
| When asked "Do you want to open (red/blue/yellow) box?" child will respond "yes" or "no". | Guess et al. Step 39 |

| | |
|---|---|
| When shown new colours and asked "what colour?", child will respond "That is (colour label) | Guess et al. Step 40 |
| When snown old/new colours and asked "what colour?" child will respond "That is ___" or "What colour?" | Guess et al. Step 41 |
| When asked "Do you want to draw?", child will respond "yes". Present crayons and ask child "What colour" (red/blue/yellow). Present picture and ask child "what is that?", child will respond ("correct label)" Repeat "Do you want a crayon?", child will respond "yes", "What colour do you want?", child will respond "I want red/blue/yellow". | Guess et al. Step 42 |

## Size and Position Location

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| When asked "What's that?" (big/little ball), child will respond "big/little ball". | Guess et al. Step 43 |
| When asked "Show me the (big/little) (object), child will respond by correct pointing. | Guess et al. Step 44 |
| When asked "Where is the (object) (big/little box)?" "What do you want to do?", child will respond "I want open (big/little) box". | Guess et al. Step 45 |
| When asked "Do you want to open the (big/little) box?" child will respond "yes" or "no". | Guess et al. Step 46 |
| When asked "Give me a (object)", child will respond "What size?", "I want the big/little (object)", child will respond by correct presentation. | Guess et al. Step 47 |
| When asked "Did I give you the (big/little) object?", child will respond "yes" or "no". | Guess et al. Step 48 |
| When asked "Show me the big/little red/blue/yellow (object)", child will respond by correct pointing. When asked "What is this (big/little, red/blue/yellow) (object)"? "Do you want (object)?" Child will respond "yes",when asked "Which object do you want?", child will respond "I want (big/little red/blue/yellow) (object). | Guess et al. Step 49 |

When asked "Where is the (object) (on/under) the (table/chair), child will respond "(On/under) the (table/chair)"
Guess et al. Step 50

When asked "Put the (object) (on/under) the (table/chair) child will respond by correct placement of object. Guess et al. Step 51

When asked "Where is the (object)?", child will respond (On/under the box").
When asked "What do you want?", child will respond "I want the (object) (on/under) the box". Guess et al. Step 52.

When asked "Is the (object) (on/under) the box?", child will respond "yes" or "no". Guess et al. Step 53

When presented with (object) on/under table/chair/box. Child will ask "Where is my (object)?" E. will respond "Your (object) is on/under the table/chair/box". Child will respond by retrieving object. Guess et al. Step 54

When asked "Where am I?", child will respond "You are inside/outside the box/circle".
When asked "Where are you?", child will respond "I am (inside/outside) the box/circle". Guess et al. Step 55

When asked "Am I inside/outside the circle?", child will respond "yes" or "no".
When asked "Are you inside/outside the circle?", child will respond "yes" or "no". Guess et al. Step 56

When asked "Where do you want to go?", child will respond "I want to go inside/outside box/room"
When asked "Where do you want me to go, child will respond "I want you to go inside/outside box/room". Guess et al. Step 57

Child will ask "Where are you going?" E. replies "I am going outside/inside the room, where do you want to go?", child will respond "I want (to) go inside/outside (the) room". Guess et al. Step 58.

When asked "Where do you want to go?", child will respond "I want (to) go inside the room".
When asked "Where do you want me to go?", child will respond "I want you (to) go inside (the) room".
When asked "Where is the (object), child will respond "On/under (the) table/chair".
When asked "Put (object) inside the red/blue box", child will respond by correctly placing the box.
When asked "Where do you want to go?", child will respond "I want (to) go outside (the) room".
When asked "Where do you want me to go?" child will respond "I want you (to) go outside (the) room".

Guess et al. Step 59

Criterion Referenced Assessment Guide

Cognitive Development

1. Visual

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A. Tracks stimulus turning head

(1) (eyes track) (no card) (C1A)

(2) looks at hands

(3) the child will follow an object from one side to the other (180°)

(4) eyes continuously follow a ring as it moves in a circle (C6A)

(5) (head to midline) (no card) (C1B)

(6) the child will follow with his eyes and turn his head when the beam of a flashlight is flashed and moved on the ceiling of a shaded room (C2)

2. Auditory

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A. Turns eyes and head in direction of sound

(1) turns eyes or moves head when hearing a sound (L-3) (C3)

(2) moves head in the direction of the sound of ringing bell as it is moved from side to side (L-5)

3. Fine Motor Sequences

I. Reach and Grasp

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A. Reach for grasp and detain small object using pincer grasp.

(1) reaches for a bright colored rattle when it is in front of him within reach (M-17; S-3) C5)

(2) grabs for object (ring) dangled above him with palmer grasp (M12A) (C7)

(3) reach for and grasp a rattle held directly in fro of him just within reach (C8)

(4) grasp and handle a rubber block or toy before dropping it (M-7) (C-11)

(5) reach for, grasp, and continue to hold rattle for minimum of 5 seconds (S-11) C9)

(6) hold a toy placed in his grasp for 10 seconds (M1

(7) grasp a toy and transfer it from one hand to the other (m-37) (C19)

(8) hold two blocks in one hand (M-27A) C23)

(9) uses thumb and index finger to grasp small objects (M-25B; M-18E) (C24)

II. Puts in Mouth

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A. Reach grasp and put specified object in mouth

(1) hands to mouth

(2) grab ring dangled above head and put in mouth (C10, M18)

(3) reach for object, grasp it, put it into mouth (C12

"Puts in"/"Puts on"

### III. Puts In

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**A.** Place objects "in" specified area.

(1) puts 3 blocks into cup (C14)

(2) puts circle and square in form board (C32)

(3) puts peg into pegboard (C37A)

(4) Place at least 5 pegs into pegboard (C37)
(clothespin size)

(5) place circle, square and triangle in correct hole without trial and error (C42)

### IV. Puts On

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**A.** Place objects "on" specified area.

(1) puts lid on oblong box (C57C)

(2) puts lid on square box

(3) puts lid on round box

### V. Removes

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**A.** Remove peg from pegboard

(1) Remove lid from box

(2) Remove 6 blocks from cup by dumping or removing one at a time (C30)

(3) Remove circle from simple wooden puzzle (C26)

(4) Remove medium sized pool from pegboard (C27)

(5) Unscrews lid (M63B)

### VI. Operations

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**A.** Follows commands re: placement of objects.

(1) close object

(2) open object

(3) removes object (takes off)

(4) removes object (takes out)

(5) puts in

(6) Puts on

(7) push

(8) pull

(9) open - take out - close

### VII. Stacking

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**A.** Build complex structure with blocks.

(1) place rings over peg in random order (C25)

(2) stack 5 rings on peg according to size (C47)

(3) when presented with 5-6 blocks, will build a tower (C43, M48)

(4) build a pyramid of 6 blocks (M93)

(5) build bridge with 3 blocks (C54)

(6) build tower and triangle on top, or train with smokestack in imitation (C55)

(7) build symmetrical objects (bridges, gates, forts, and blocks without help) (C74)

### VIII. Stringing

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A. Strings beads of varying sizes

i) Lacing Holes
   (1) threads shoelace through one hole card
ii) Lacing Card
   (1) threads shoelace through five hole card
iii) Beads
   (1) strings 6 small beads

### IX. Manipulation Skills

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(1) Turns 2-3 page of books at a time (C59)

(2) Opens door (C63A)

(3) Closes door (C63A)

(4) Tears paper

(5) Turns 1 page of book at a time (C72)

(6) Cuts with scissors

(7) Cuts circle out scissors

(8) Opens jar lid (M63B)

(9) Unwraps candy (M67)

(10) Completes 6 piece puzzle without trial & error (puzzle pieces not interlocking)(C59)

### X. Writing

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A. Able to copy any word by writing

(1) scribbles holding pencil in fist grasp

(2) scribbles holding pencil with "pencil grasp"

(3) draws vertical line between two parallel lines

(4) draws horizontal line between two parallel lines (C

(5) reproduces cross (M86)

(6) reproduces square (C60)

(7) reproduces triangle (C95)

(8) reproduces circle (C44)

(9) colours within one inch of square

(10) writes 26 lower case letters

(11) writes 26 upper case letters

(12) writes given and last names

(13) writes numerals 0 to 10

(14) writes 26 lower case letters on line

(15) writes 26 upper case letters on line

(16) writes numerals 0 to 10 on line

(17) copies a word correctly on line

(18) copies 5-word sentence correctly on line

### 4. Self-Awareness

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A. Correctly draws a person including all major body parts.

(1) able to point to at least one body part, either on himself or on a doll or on another person (C39)
(2) points to 10 body parts on himself or a doll, when asked (C64)
(3) completes man (flanel board) 1 element missing

cont/d

4. Self-Awareness Cont/d

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(4) completes man (flanel board) 3 elements missing

(5) draw a recognizable man with body, arms and legs and face with eyes, ears, nose, mouth and hair (C84)

5. Auditory Sequential Memory

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A. Retell simple, familiar story

(1) repeats taped pattern - able to repeat a simple rhythm pattern (C50A)
(2) repeat 2 numbers in the same order that they were given (C52)
(3) repeat a sequence of 3-4 numbers in order and in imitation (C69)
(4) recognize and repeat familiar nursery rhymes (C80)
(5) sing simple songs that are familiar (at least 30 words (C82)
(6) retell a simple plot of a story that is familiar (One that he has heard at least three times) (C81)

6. Arithmetic - Time

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A. Tell time on command

(1) discriminate between spoken and pictured (C76) activities as to which is morning and which is night
(2) describing an activity, the child will make appropriate usage of "yesterday", "today", "tomorrow," "morning", "afternoon", and "evening". (C71A)
(3) correctly identify all 7 days of the week, e.g. "Today is Tuesday". (C86B)
(4) answers the following questions with respect to time: (C76A)
    (i) what time do you get up?
    (ii) what time do you eat lunch? supper?
    (iii) what time do you go to school? bed?

7. Matching

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A. Duplicate patterns varying is shape, color and size.

(1) match two like objects or simple pictures (C40)
(2) match colour to colour, i.e. red to red, (C61) yellow to yellow, blue to blue.
(3) match objects that are related (cup and saucer, fork to spoon, chair and table, banana and oran shoe and sock). (C78)
(4) when shown a horizontal array of four cards containing geometric shapes, the student should be able to duplicate the same pattern using his own board and selecting the four cards from a g of from four to seven cards. (DA1)

8. Classifying

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A. Classify objects by colour, size and shape

(1) identify and name red, yellow, and blue (C62)
(2) identify objects as being a certain colour (C79 i.e. apples are red, bananas are yellow, grass green, and the sky is blue.
(3) tell which ball or book is little, which is big (one inch different in size) (C58)
(4) point to or name heavy and light objects when t difference is one pound (C77) (C66)
(5) discriminate by naming which line or object is long, which is short (C85)
(6) choose a stick that is longer than another stic on 4 out of 5 trials (C60A)
(7) describe an object as rough or smooth, point to rough or smooth object (C66A)
(8) point to or name three shapes, circle, square and triangle (C90)
(9) correctly identify objects along the dimensions size and colour (e.g. the big red ball, the sma yellow circle, etc.) (C62A)

## 9. Counting

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A. Able to associate numbers with blocks in one to one correspondence.
  - (1) when teacher counts from one to a particular number, student should tell her what number she counted to (DA-11-1)
  - (2) when teacher specifies a number student should be able to count from one to that number (DA-11-2)
  - (3) when teacher specifies a number, student should be able to begin counting at that number and count until stopped by teacher (DA-11-3)
  - (4) when teacher specifies two numbers, student should be able to begin at the first number and count to second number (DA-11-4)
  - (5) when teacher drops objects into container, student should be able to count objects (up to ten) as they are dropped and then state how many objects are in the container (DA-11-5)
  - (6) child will hand you the number of objects asked for 1-5.
  - (7) when teacher claps her hands, student should be (C73) able to count as she claps (up to seven times) and then state how many times she clapped (DA-11-6)
  - (8) when teacher draws up to eleven lines on the board, the student should be able to count lines as she draws them and then state how many lines there are (DA-11-7)
  - (9) when teacher shows students pictures of various groups of objects, student should be able to count number of objects in whole group or any designated subgroup and then state how many objects there are (C72) (DA-11-8)

## 10. Symbol Identification

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A. Student will associate a written numeral with a designated quantity.
  - (1) when teacher presents a random display of numerals and/or symbols, student should be able to cross out any specified numeral or symbol (DA-111-1)
  - (2) when teacher writes a numeral or symbol on the board, student should be able to identify it (DA-111-2)
  - (3) when presented with the numerals 1, 2, 3 ---9, student should be able to identify it (DA-111-4
  - (4) when presented with any numeral from 0-99 stude should be able to identify it (DA-111-5)
  - (5) when presented with printed sample of a numeral symbol and series of dotted line versions of it students should be able to write the numeral or symbol by tracing the dotted lines and to say w he is making (DA-111-6)
  - (6) when presented with printed sample of the numer or symbol and a starting dot, the student shoul able to write the numeral or symbol and to say he is making. (DA-111-7)
  - (7) when presented with printed numeral, student sh be able to indicate how many lines to draw unde the numeral and to count as he draws each line (DA-111-8)
  - (8) when presented with printed numeral with one or lines drawn under it, student should be able to state how many lines there are and then count f that number to the number indicated by the prin numeral and draw the remaining lines DA-111-9)
  - (9) when presented with a series of printed lines a an empty box, student should be able to count t lines and draw the numeral in the box (DA-111-1

1. Visual

A. Sitting on another adults knee in a partially darkened room the child will block the stimulus (a pen light, flash light) held 15 cm from centre of his face, within 5 seconds of the command "Look here" and the appearance of the light when the flash light is moved a distance of 10 cm. to each side from centre. The child's eyes must have focused on the light before it is moved, movement must be performed slowly. (C1)

(1) Lying supine (on back) child will look at a large coloured block held at a distance of 15 cm. from the side of his face within 5 seconds of the command "Look here" and follow it horizontally at least to the midline. (C1A)

(2) Lying supine (on back) child will look at his hands for 3 seconds within 5 seconds of the E. raising both his hands across his chest to eye level at a distance of 10 cm.

(3) Child seated on the floor E. moves a coloured block from 15 cm. from one side of his head to 15 cm. from other side of his head (180°). Child will follow the block within 5 seconds of the command, child's name "Look". (C6)

(4) Child seated on the floor E. swings a coloured ring in 30 cm. circles in front of his face. Child will follow the moving ring for 5 seconds within 5 seconds of the command, child's name "Look". (C6A)

(5) Child lying supine (on back) E. moves a large coloured block from 15 cm. from one side of his face to midline, stops for 3 seconds and continues to 15 cm. from other side. Child will follow block with eyes to midline position, stop and continue following to other side when movement recommences; within 5 seconds of the command, child's name "Look". (C1B)

(6) Seated on another adults knee in a darkened room the child will follow the beam of a flash light with his eyes as the E. moves it across a wall toward the child's side within 5 seconds of the command, "________ look". (C2).

2. Auditory

A. Seated on the floor the child will turn his eyes and head in the direction of the sound (rattle or bell) within 5 seconds of the sounds occurrence and on 2 out of 3 trials.

(1) Seated on the floor the child will turn either eyes or head toward sound (to the shaker) at the side of his head, out of peripheral vision, within 5 seconds of the sounds occurrence and on 2 out of 3 trials. (C3)

(2) Seated on the floor E. shakes rattle from behind child and continues as rattle is moved to child's side. Child will move head in direction of sound within 5 seconds of the sounds occurrence. (C4).

3. Motor - Reach and Grasp

A. Seated on the floor child will reach for grasp and retain a small object (buttons of various sizes) using pincer grasp and hold it for 5 seconds within 5 seconds of the command, child's name "take, or you take".

(1) Seated on the floor, the child will reach for a rattle held 15 cm. in front of him and shaken by E. within 5 seconds of the command, child's name "you take". (C5, M17, 58)

(2) Seated on the floor the child will reach for and grab at a ring dangled 15 cm. in front of his face within 5 seconds of its presentation. (C7, M12A)

(3) Seated on the floor the child will reach for and grasp a rattle held 30 cm. in front of him within 5 seconds of its presentation. (C8).

(4) Seated on another adults knee the child will grasp and retain a rubber peg for 5 seconds minimum before dropping it. E. will hold the peg in front of the child at midline and within reach. The child will grasp the peg within 5 seconds of presentation. (C11, M7).

(5) Seated on the floor the child will reach for, grasp and continue to hold a rattle for a minimum of 5 seconds. The rattle is held by the E. at a distance of 30 cm. from the child's midline and shaken. The child will grasp the rattle within 5 seconds of its presentation. (C9, S11)

(6) Seated on the floor the child will hold a toy (Matchbox car) placed in his grasp by E. for a minimum of 10 seconds before dropping it. (M16)

(7) Seated on the floor the child has a 2.5 cm. block placed in his R. hand by E. Also holding a block in his R. hand the E. transfers it to his L., then back to his R. and says "Now you do it" pointing to child's block. Child will transfer his block from R. to L. hands within 5 seconds of command, child's name "you do". (C19, M37)

(8) Seated at a desk the child is given 1 block followed by a second block both to be held in the same hand. The child will hold 2 blocks in one hand for a minimum of 5 seconds, after presentation, after being given the command "Hold". C23, M22A).

(9) Sitting on the floor the child will pick up a small rubber peg between index finger and thumb which the E. placed directly in front of the child. The child will grasp the object between his finger and thumb within 5 seconds of the command "Pick up". (C24, M25B, M18E)

Puts in Mouth

A. Lying supine or seated on the floor the child will reach, grasp and put specified object (rattle) in his mouth within 5 seconds of its presentation directly in front of his face.

(1)

(2) Lying supine the child will grasp a ring dangled 15 cm. above his face and put it into his mouth within 5 seconds. (C10, M18).

(3) Seated on another adults lap the child will grasp a rubber peg, held 30 cm. from his midline, and place it into his mouth within 5 seconds. (C12)

Puts in/Puts on

A. Child will place objects in a specific place within 5 seconds of the command "Put in" or "Put on" on 2 out of 3 trials.

i) Puts In

(1) Seated at a desk the child is presented with 3, 2.5 cm. blocks and a cup by the E. These objects are positioned in front of him with 3 blocks in a row from R. to L. the cup directly behind the centre block. The child will place the blocks in the cup commencing the activity within 5 seconds of the command "Put in". (C14)

(2) Child seated at a desk E. places a wooden form board directly in front of him containing circle, square and triangle - the later is taped down. E. removes circle and square. Within 5 seconds of the command "Put in (E. points to circle) child will place form into correct place without trial and error. Repeat same procedure with square. (C32).

(3) Presented with a pegboard and one peg of medium size (8 cm.) the child will place the peg in the peg board within 5 seconds of the command "Put in" on 2 out of 3 trials. (C37A)

(4) Peg board is placed on desk between E. and child the E. removes the 5 pegs (clothes pin size). Within 5 seconds of the command "Put in" child will successfully place the 5 pegs in pegboard on 2 out of 3 trials. (C37).

(5) Child seated at a desk E. places a wooden form board directly in front of him containing circle, square and triangle. E. removes all forms. Within 5 seconds of the command "Put in" (E. points to circle) child will place form into correct place without trial and error. Repeat same procedure with square and triangle. (C42)

ii) Puts On

A. Place objects "on" specified area.

(1) Given an oblong box with the lid removed and placed beside it the child will put the lid on the box within 5 seconds of the command "Put on" on 2 out of 3 trials. (C57c)

(2) As (1) substitute square box.

(3) As (1) substitute round box.

Removes

A. Seated at a desk the child will remove peg from peg board within 5 seconds of the command "Take out" on 2 out of 3 trials.

(1) Seated at a desk or on the floor and presented with a cup containing 6 blocks the child will remove all the blocks from the cup within 5 seconds of the command "Take blocks out" on 2 out of 3 trials. (Blocks may be removed singly or as a group). (C30)

(2) Presented with an oblong box with the lid on the child will remove the lid within 5 seconds of the command "Take lid off" on 2 out of 3 trials.

(3) Presented with a form board containing a circle the child will remove the circle from the board within 5 seconds of the command "Take out". (C26).

(4) Presented with a peg board containing 1 medium sized peg (8 cm) the child will remove the peg from the board within 5 seconds of the command "Take out". (C27).

(5) Presented with a 10 cm. mason jar, containing a small toy, the child will unscrew the lid within 5 seconds of the command "Take lid off". (M63B)

Operations

A. Regardless of the materials/objects used the child will complete the following operations as combinations of operations commencing the activity within 5 seconds of the command "Put in", "Put on", "Take off", "Take out", "push", "Pull", "Open", "Close", combinations e.g. "Put on _________Take off"
"Open ___________Close"
"Put in __________Take out"
"Push ____________Pull"
"Open ______Take out_______Close"

(1) The child will close an object within 5 seconds of the command "close" regardless of the material/object presented on 2 out of 3 trials.

(2) The child will open an object within 5 seconds of the command "Open" regardless of the material/object presented on 2 out of 3 trials.

(3) The child will take one object off another within 5 seconds of the command "Take off" regardless of the specific objects used on 2 out of 3 trials.

(4) The child will take an object out of another within 5 seconds of the command "Take out" regardless of the specific objects used on 2 out of 3 trials.

(5) The child will put one object into another within 5 seconds of the command "Put in" regardless of the specific objects involved on 2 out of 3 trials.

(6) The child will put one object on top of another within 5 seconds of the command "Put on" regardless of the specific objects involved on 2 out of 3 trials.

(7) The child will push any object that is less than 1/2 his weight within 5 seconds of the command "Push" regardless of the object involved (providing it conforms to the weight criteria) on 2 out of 3 trials.

(8) The child will pull any object that is less than 1/2 his weight within 5 seconds of the command "pull" regardless of the object involved (providing it conforms to the weight criteria) on 2 out of 3 trials.

(9) The child will open an object, take out the contents and replace the lid commencing the activity within 5 seconds of each command "Open" ______ "Take out"_______"Close".

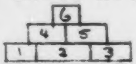
Stacking

A. Given at least 12, 2.5 cm. blocks the child will build complex symmetrical and asymmetrical structures commencing the activity within 5 seconds of the command "You build", with a model present.

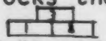
(1) Seated at a desk or on the floor the child will place 5 rings over a peg in random order, commencing the activity within 5 seconds of the command "Put on" and on 2 out of 3 trials. (C25).

(2) Seated at a desk or on the floor the child will place 5 rings over a peg in order of size from largest to smallest commencing the activity within 5 seconds of the command "Put the rings on from big to little" on 2 out of 3 trials. (C47A).

(3) Seated at a desk and given 5-6, 2.5 cm. blocks the child will complete a tower stacking all the blocks, commencing the activity within 5 seconds of the command "Build a tower" with a model present (after the last block has been placed the tower must remain standing for 5 seconds) on 2 out of 3 trials. (C43, M48).

(4) Seated at a desk and given 6, 2.5 cm. blocks the child will build a "house" (pyramid) using all the blocks 

commencing the activity within 5 seconds of the command "Build a house" with a model present, on 2 out of 3 trials. (M93)

(5) Seated at a desk and given 3 blocks the child will build a "bridge" using all the blocks 

commencing the activity within 5 seconds of the command "Build a bridge", with a model present on 2 out of 3 trials. (C54)

(6) Given the 4 blocks from the form board the child will observe the E. stack the blocks in any order leaving the triangle on top on command "Watch what I do", E. will tell child "This (pointing to △) must be on top". Given the blocks the child will build a tower with △ on top within 5 seconds of command "Make one the same with this (points to △) on top". (C55)

(7) Given 10-15 blocks (2.5 cm. size) child will build the following symmetrical objects within 5 seconds of the command "Make a bridge", "Make a gate", "Make a fort", on 2 out of 3 trials. (C74)

Stringing

A. Within 5 seconds of the command "Put on" the child will string a specified number of beads of varying sizes within a 30 second period.

i) Lacing Holes

(1) The child will push a shoe lace with a stiffened end through a 0.63 cm. diameter hole (paper punch size) in a 2.54 cm. square of cardboard which he will hold in his hand while pulling the string through from the back within 5 seconds of the command "Push string through" and the task completed within 15 seconds on 2 out of 3 trials.

ii) Lacing Card

(1) The child will string a shoe lace with stiffened tip through 5 holes in a lacing card (hole size same as #3) commencing the activity within 5 seconds of the command "String the Card" and completing the task within 60 seconds on 2 out of 3 trials.

iii) Beads

(1) The child will string 6, 1.5 cm. diameter beads on a shoe lace which has one end knotted and the other stiffened commencing the activity within 5 seconds of the command "Put the beads on the string" and completing the task within 60 seconds on 2 out of 3 trials. (C48P)

Manipulation Skills

(1) Given a "Little Golden Book" the child will turn 2-3 pages at a time within 5 seconds of the command "Turn the pages" (M59).

(2) Within 5 seconds of command "Open door" the child will turn door knob of a closed door sufficiently to allow E. to push the door open. (M63A)

(3) Within 5 seconds of command "Close door" the child will turn the door knob of an open door (ajar no more than 20 cm.) sufficiently to allow the lock to close. (M63B)

(4) Given a piece of paper 20 x 28 cm. the child will tear at least 8 cm. into the paper within 5 seconds of the command "Tear the paper in half" on 2 out of 3 trials.

(5) Given a "Little Golden Book" the child will turn one page at a time within 5 seconds of the command "Turn the page _____" on 2 out of 3 trials.

(6) Seated the child will "cut a 2.5 cm. line with blunt nosed scissors. With the E. holding the paper the child will begin cutting within 5 seconds of the command "Cut the paper", meeting the standards set by a sample.

(7) Seated at a desk, given a pair of scissors and a piece of paper with a 15 cm. circle marked on it the child will cut around the pencil width circle by folding the paper and using single-handle scissors commencing the activity within 5 seconds of the command "Cut out the circle" on 2 out of 3 trials. (Phase VL) The product will satisfy standards set by a sample.

(8) Within 5 seconds of the command "Open the jar" the child will unscrew and remove the lid of a 10 cm. mason jar which contains a small toy (M63B)

(9) Given a wrapped candy the child will begin to remove the wrapper within 5 seconds of receiving it. (M67)

(10) Seated at a desk and given a 6 piece non interlocking wooden puzzle the child will complete the puzzle by putting the pieces into their correct places in random order commencing the activity within 5 seconds of the command "Put the pieces in the puzzle" on 2 out of 3 trials. (C59)

Writing

A. The child will copy any word by writing it legibly on a line with uppercase letters above the centre line and lowercase letters touching the centre line.

(1) Given a piece of paper and a wide (jumbo) crayon the child will scribble holding the crayon in a fist grasp, with the crayon being continuously in contact with the paper for 2 seconds. (E. may place crayon in child's hand) (C34)

(2) Given a piece of paper and a pencil the child will scribble holding the pencil with "adult pencil grasp", with pencil being continuously in contact with the paper for 2 seconds. (C34A)

(3) Given a piece of paper and a kindergarten pencil the child will draw a vertical line from a point on the top of the page to a point on the bottom of the page. The child will commence the activity within 5 seconds of the command "Make a line". The completed line will be within 45° of the vertical and within one inch to the left or right of the model. (B.W.P.D.)

(4) Given a piece of paper and a kindergarten pencil the child will draw a horizontal line from a point on the left side of the paper to a point on the right side. The child will commence the activity within 5 seconds of the command "Make a line". The completed line will be within 45° of the horizontal and within 1 inch above or below the model. (C45, B.W.P.C.)

(5) Given a piece of paper and an H.B. pencil the child will draw a cross, without a model commencing within 5 seconds of the command "Draw a cross". The cross must contain 4 right angles and 2 continuous straight lines both lines within an inch in either direction of the model. (M86, B.W.P.E.)

(6) Given a piece of paper and an H.B. pencil the child will draw a square, without a model commencing within 5 seconds of the command "Draw a square". The square must not be more than half again as long as it is wide, sides must not be broken, but may be slightly bowed, corners must not be rounded. (C60, B.W.P.'F')

(7) Given a piece of paper and an H.B. pencil the child will draw an equilateral triangle within 5 seconds of the command "Draw a triangle". The triangle must contain lines joined at each apex corners must not be rounded, but sides may be slightly bowed. (C75, B.W.P.'G')

(8) Given a piece of paper and an H.B. pencil the child will draw a circle, starting at the top of the circle and moving the pencil counter clockwise without a model, commencing within 5 seconds of the command "Draw a circle". The circle must be round and closed, more curved than eliptical. (C44, B.W.P'H')

(9) Given a piece of paper with a horizontal row of 6, 2.5 cm. squares outlined on it the child will colour each of the squares solidly without colouring outside the lines with one dark crayon commencing the activity within 5 seconds of the command. "Colour in all the squares". (B.F.M.S.P."K")

(10) Given a piece of unlined paper and an H.B. pencil the child will legibly write 26 lower case letters "a" through "z" commencing within 5 seconds of the command "Make the ______" (B.W.P.'I')

(11) Given a piece of unlined paper and an H.B. pencil the child will legibly write 26 upper case letters "A" through "Z" commencing within 5 seconds of the command "Make the ______" (B.W.P.'J')

(12) Given a piece of unlined paper and an H.B. pencil the child will legibly write his given and last names with two finger spaces between given and last name without a model. Commencing within 5 seconds of the command. "Write both your names". (B.W.P.'K')

(13) Given a piece of unlined paper and an H.B. pencil the child will legibly write numbers 0 to 10 commencing within 5 seconds of the command "Make the number _____" (B.W.P.'L')

(14) Given a piece of lined primary paper and an H.B. pencil the child will legibly write 26 lower case letters "a" through "z" on a line. The top of the letters touching the top line and the bottom of the letters touching the bottom line. Commencing within 5 seconds of the command "Make the ______" (B.W.P.'M')

(15) Given a piece of lined primary paper and an H.B. pencil the child will legibly write 26 upper case letters "A" through "Z" on a line. The top of the letters touching the bottom line. Commencing within 5 seconds of the command "Make the _____" (B.W.P.'N')

(16) Given a piece of lined primary paper and an H.B. pencil the child will legibly write the numbers 0 to 10 on a line without a model. Commencing within 5 seconds of the command "Write the number _____" (B.W.P.'O')

(17) Given a piece of lined primary paper and an H.B. pencil the child will copy legibly a word correctly within a model. Upper case letters are above the centre line, and lower case letters are touching the centre line commencing within 5 seconds of the command "Write ______" (B.W.P. 'P')

(18) Given a piece of lined primary paper and an H.B. pencil the child will copy legibly a 5 word sentence copying each word on a line, with a 3 m. space between each letter, two finger spaces between each word, upper case letters above the centre line, and lower case letters touching the centre line commencing within 5 seconds of the command "Write ______". (B.W.P. 'Q')

4. Self-Awareness

A. See objective 7

(1) When shown a doll (at least 30 cm in height) the child will point to the dolls nose within 5 seconds of the command "Show me the doll's nose". Child will point to the dolls nose 2 out of 3 trials. (C39)

(2) The child will point to the body part specified within 5 seconds of the command "Show me your _____". 10 body parts will be identified by the child indirectly - nose, leg, mouth, arm, feet, fingers, eyes, ears, head, leg. Child will successfully identify 9 of the 10 parts. (C64)

(3) Given a flannel board with an incomplete figure of a stickman on it (1 leg missing) the child will place the missing part in the appropriate position commencing within 5 seconds of the command "Put on the part that is not there".

(4) Given a flannel board with an incomplete figure of a stickman on it (1 leg, 2 arms missing) the child will place the missing parts in their appropriate positions commencing within 5 seconds of the command "Put on what is missing".

(5) Given an incomplete drawing of a stickman (1 leg missing) on a large sheet of yellow paper and an HB pencil the child will draw in the missing part within 5 seconds of the command "Draw in the part that is not there". (C57)

(6) Given an incomplete drawing of a stickman (1 leg, 2 arms missing) on a large sheet of yellow paper and an HB pencil the child will draw in the 3 missing parts within 5 seconds of the command "Draw in what's missing". (C83)

(7) Given a large sheet of yellow paper and an HB pencil the child will draw a recognizable man (with body, arms, legs and face with eyes, ears, nose, mouth and hair) within 5 seconds of the command "Draw a man". Child will draw a recognizable man with specified parts on 2 out of 3 trials. (C84)

5. Auditory Sequential Memory

A. See objective 6

(1) Seated at a desk the child will observe the E, on the command "Watch me do this", make one hand into a fist and tap the desk top with the knuckles to a rythm (1,2 pause 3,4,5). The child will imitate the model correctly on 2 out of 3 trials within 5 seconds of the command "Do this". (C50A)

(2) Child will repeat 2 numbers in the same order within 5 seconds of the command

7,5 3,6 4,3

Child will repeat the 2 digit sequence correctly in 2 out of 3 trials. (C52)

(3) The child will repeat a sequence of 4 numbers in order and in imitation of the E. within 5 seconds of the command "Listen I am going to say some numbers, and I want you to repeat them - (say sequence of 4 numbers), now you say them". Child will successfully repeat the 4 number sequence in 2 out of 3 trials (C69)

(4) The E. seated with the child will read a nursery rhyme from a book of nursery rhymes. Within 5 seconds of the command "You say the same rhyme" the child will repeat the rhyme with no more than 2 errors on 2 out of 3 trials. (C80)

(5) Seated with the child the E. will sing "Rock a bye baby". Within 5 seconds of the command "You sing a song" the child will sing a song of at least 30 words in length on 2 out of 3 trials. (C82)

(6) Seated with the child the E. will read the story "Goldilocks and the three bears" 3 times to the child. Within 5 seconds of the command "Now you tell me the story" the child will retell the story including at least 5 details e.g. baby bear, porridge etc. on 2 out of 3 occassions. (C81)

6. Arithmetic - Time

A.

(1) Shown pictures depicting morning and night activities e.g. breakfast, dinner time, the child will correctly identify 4 out of 5 "morning pictures" and 4 out of 5 "night pictures" within 5 seconds of the command "Which pictures are morning pictures and which ones are night pictures". (C76)

(2) The E. will ask the child the following questions on 5 consecutive days.

What did you do yesterday?
What have you done today?
What will you do tomorrow?

What do you do in the morning?
What do you do in the evening?
What do you do in the afternoon?

Within 5 seconds of the command the child will answer all questions correctly, using the keyword once in the answer, e.g. Today ________ on 4 out of the 5 days.

(3) The child will correctly identify all the days of the week on 4 out of 5 weeks when asked daily "What day is today?" the child will respond with "Today is ______" within 5 seconds of the command.

(4) The child will answer the following questions with respect to time appropriately 2 out of 3 times within 5 seconds of the command

What time do you get up?
What time do you eat lunch? supper?
What time do you go to school? Bed?

7. Matching

A.

(1) Place 4 objects in front of the child (2 balls and 2 blocks 2.5 cm size). E picks up 1 ball and says "Give me the other ball" within 5 seconds of the command the child will pick up the appropriate article. (Repeat alternating articles for 3 trials). The child must correctly match article specified on 2 out of 3 trials. (C40)

(2) Given the clownman the child will match the colours red to red, yellow to yellow and blue to blue correctly on 2 out of 3 trials within 5 seconds of the command (C61)

(3) When given the following objects, cup, sock, knife, saucer, shoe, fork, pencil, banana, eraser, apple, the child will match related objects e.g. sock to shoe within 5 seconds of the command. Child will correctly match 4 out of the 5 sets of objects. (C78).

(4) When shown a horizontal array of four cards containing geometric shapes, the student should be able to duplicate the same pattern using his own board and selecting the four cards from a group of from four to seven cards. (DA1)

8. Classifying

A.

(1) Child will correctly identify colours of blocks 3 out of 4 times within 5 seconds of the command "What colour is this?" and E picking up block. Colours to be identified red, yellow and blue. (C62)

(2) Child will answer 4 out of the following 5 questions correctly within 5 seconds of each command

"What colour are apples?"
"What colour are bananas?"
"What colour is grass?"
"What colour is the sky?"
"What colour is the snow?"

on 2 out of 3 trials. (C79)

(3) Seated at a desk the child is presented with a large block ball and circle (8 cm) and a small block, ball and circle (2.5 cm) in front of him. Within 5 seconds of the command "Put the big ones here" and the E pointing to childs right the child will successfully sort the large objects on 2 out of 3 trials. E. will return the large and small objects to their original position. Within 5 seconds of the command "Put the little ones here" and the E pointing to the child's left the child will successfully sort the little objects on 2 out of 3 trials. (C58)

(4) Given two paper bags one containing objects weighing 1.8 kg. and the other 1.3 kg. Holding both the child will correctly identify the heavy (or the light) bag on 2 out of 3 trials within 5 seconds of the command "Which one is heavy?" Which one is light?" (C66)

(5) Presented with 5 long drinking straws (10 cm) and 5 short drinking straws (5 cm.) the child will correctly identify the longer/shorter straw of 4 out of 5 pairs within 5 seconds of the command "Point to the long/short one". (C85)

(6) Given a 15 cm stick and a 5 cm stick the child will correctly identify the longer stick on 2 out of 3 trials within 5 seconds of the command "Give me the longer one" or point to the longer one". (C60A)

(7) Given a synthetic number card the child will point to smooth and rough areas correctly on 2 out of 3 trials within 5 seconds of the command "Point to a part that is smooth/ rough". (C66A)

(8) Given a card containing a square, circle and triangle the child will correctly identify each form on each of 3 trials within 5 seconds of the command "Point to the circle/ square/ triangle". (C70)

(9) Given a large and small (8 cm. and 2.5 cm) yellow block and the same sized red blocks the child will correctly identify the large/small block on 2 out of 3 trials within 5 seconds of the command "Give me the big red block". "Give me the small yellow block". (C62A)

9. Counting

A.

(1) through (5) same as guide.

(6) Given 10 2.5 cm. blocks the child will assemble the correct number of blocks on 2 out of 3 trials within 5 seconds of the command
"Give me 3 blocks".
"Give me 1 block".
"Give me 5 blocks".
(numbers are to be requested out of sequence) (C73)

(7) through (9) same as guide.

10. Symbol Identification

A.

(1) through (9) same as guide.

# Criterion Referenced Assessment Guide

## Motor Development

1. Controlled Eye Movements

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A. Looks at object in hands (P15A)

(1) eye movements on back (P5)

(2) looks and holds (P7A)

(3) looks at hands (P14)

2. Head Control Prone

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A. Holds head and chest up 15 seconds prone on elbows (P13)

(1) holds head up 5 seconds (P6)

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B. Lifts head - prone on elbows

(1) raises head within 10 seconds (P2)

(2) raises head within 5 seconds prone on elbows (P8)

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C. Turns head and reaches for toy prone on elbows

(1) head turning (P3)

(2) raises head (P8)

3. Head Control Supine

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A. Holds head up 15 seconds

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B. Lifts head within 10 seconds

(1) lifts head momentarily within 1 minute (P11A)

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C. Turns head

(1) moves head side to side (P4)

4. Rolling

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A. Rolls back to stomach

(1) rolls side to stomach

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B. Rolls stomach to back (P21)

(1) rolls side to back (P10B)

5. Sitting

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A. Sits with back unsupported on floor and chair (P29)

(1) head erect

5. Sitting - cont'd

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(2) sit with maximum body support (P9)

(3) holds head steady when carried (P10)

(4) sits with minimum support (P19)

(5) sits self-supported on floor (P24)

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Bi. Comes to sit from lying (P27)

(1) rights self (P6A)

(2) turns head freely in sitting (P12)

(3) holds head erect when pulled to sitting (P15)

(4) comes to sit with aid (P22)

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Bii. Sits on stool from stand (P53)

(1) pulls self to sitting (P18C)

(2) lowers self to sitting (P38)

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C. Lies down from sitting (P26)

6. Controls Drooling

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A. Child controls saliva within his mouth

(1) sucks and swallows

(2) sucks food off lip (P1)

(3) wipes mouth

## 7. Crawling

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A. Balance on hands and knees

(1) prone with arms straight

(2) heel sit with arms straight

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Bi. Raises to hands and knees from prone

(1) pushes up with arms straight from prone

(2) pushes to heel sit

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Bii. Turns from sit to hands and knees (P32)

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C. Crawls (P30)

(1) creeps on abdomen (P25)

(2) rocks on hands and knees (P24A)

## 8. Walking

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A. Stands with correct posture

(1) bears weight on his feet (P23)

(2) stands self-supported when holding stable object with 2 hands (P35)

(3) stands self-supported when holding stable object with 1 hand (P35)

(4) stands self-supported when holding flexible hose with 1 hand

cont

8. Walking - cont'd

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|  |  |  |  | (5) stands momentarily unsupported |
|  |  |  |  | (6) stands unsupported (P41) |
|  |  |  |  | (7) knees not hyperextended |
|  |  |  |  | (8) back straight |
|  |  |  |  | (9) feet hip distance apart |
|  |  |  |  | (10) head up |
|  |  |  |  | (11) hips extended |
|  |  |  |  | (12) feet externally rotated 10° - 40° |

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|  |  |  |  | Bi. Stands up from chair unassisted |
|  |  |  |  | (1) puts feet flat on floor |
|  |  |  |  | (2) pulls self to standing when holding stable object with 2 hands (P35) |
|  |  |  |  | (3) pulls self to standing when holding stable object with 1 hand |
|  |  |  |  | (4) pulls self to standing when holding flexible hose with one hand. |

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|  |  |  |  | Bii. Stands up from sitting on floor |
|  |  |  |  | (1) stands from sitting on floor by pulling on furniture |

8. Walking - cont'd

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C. Walks in coordinated fashion

(1) walks when holding stable object with 2 hands (P40)
(2) walks when holding E. finger with one hand (P55)
(3) walks when holding flexible hose with one hand
(4) walks unsupported
(5) walks with correct posture and good balance
(6) walks with correct posture using coordinated knee bends
(7) heel - toe gait
(8) reciprocal arm swing.

9. Stairs

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A. Walks up unassisted

(1) crawls up stairs (P42)
(2) walks up stairs with aid (P56)
(3) walks up curb

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B. Walks down stairs

(1) crawls down stairs (P43)
(2) walks down stairs with aid (P57)
(3) walks down curb

10. Running

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A. Runs in coordinated fashion
  1) runs 10 steps(P69)
  2) negotiates curves(P76A)
  3) runs smoothly at varied rate(P76b)

11. Sitting motions and activities

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1) assisted sits on RH or RC
2) unassisted sits on RH or RC
3) sits on tricycle
4) sits on swing
5) sits on slide

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1) assisted gets on RH or RC
2) unassisted gets on RH or RC
3) gets on tricycle
4) gets on swing
5) gets on slide

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1) assisted rocks on RH or RC(P54)
2) unassisted rocks on RH or RC(P70)
3) pedal tricycle (P79)
4) swing on swing(P80)
5) slide down slide(P81)

## 12. Hopping

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A. Coordinated hopping

1) stands on one foot with aid(P65)
2) stands on one foot unassisted(P78)
3) kicks ball(P71)
4) hops with aid(P82)
5) hops without aid(P89)

## 13. Advanced Locomotion

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1) forward somersault with aid(P83)
2) jump from height of 12 inches(P84)
3) jumps forward(P90)
4) begins to skip(P92)
5) skips(P94)
6) somersaults without aid(P95)

## MOTOR SKILL DEVELOPMENT

### 1. Upper Extremity

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1) opens hands
2) feels and explores object with hands(P20)
3) imitates upper extremity motions
4) pushes box with 1/4 his weight
5) pulls box with 1/4 his weight
6) lifts 20% of his weight
7) lifts 5% of his weight for upper extremity exercises
8) carries 20% of his weight
9) touches fingers in succession with thumb(P86A)
10) touches point of nose with eyes closed

### 2. Ball Control

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1) flings object haphazardly(P33)
2) rolls ball in imitation(P45)
3) throws ball without direction(60)
4) throws ball with direction(P77)
5) catches ball(P85)
6) bounces ball(P91)

### 3. General Mobility

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1) leg lifts
2) curl ups
3) modified push-ups
4) back extension
5) hamstring stretching
6) trunk flexion
7) squatting
8) jumping jacks
9) chin-ups

1. Controlled Eye Movements

   A. After placing an object in the child's hand, he will focus his eyes on it within 5 seconds for a duration of 2 seconds (15A)

      (1) Eye movements on back
      Child will, while lying on his back, follow a moving object or a light held 15-20 cm. with his eyes from the centre two inches to the left and right side of his head.

      (2) Looks and holds
      Child will stare at tester's face for 5 seconds if it is within 15-25 cm. of child's eyes.

      (3) Looks at hands
      Child will bring his hands to his face and look at them for 2 seconds at least once during a one-minute observation session preceded by the tester touching the child's hands and bringing them in front of child's face.

2. Head Control Prone (on abdomen)

   A. Child will hold his head in full face forward position for 15 seconds if child is placed prone on elbows with head up within 5 seconds of being told to "look" and offered a toy within view.

      (1) Hold head up 5 seconds
      Child will hold his head in full face forward position for 5 seconds while prone if told to "look" and offered a toy held 1 foot from child at a height of 15 cm. within 5 seconds of command.

   B. If child is placed prone on elbows, he will lift his head up to full face forward position with 5 seconds if told to "look" and offered a toy within view.

      (1) Raises head
      Child will raise his head 8 cm. off floor within 5 seconds of rattle sound made 15 cm. above head.

      (2) Raises head
      Child will raise his head at least 15 cm. off mat to full face forward position while prone within 5 seconds of being told to "look" and offered a toy within view.

   C. If child is placed on elbows with head up, he will turn his head from side to side within 5 seconds of being told to "look" and offered a toy within view.

      (1) Head turning
      Child will turn his head from centre of body to R and L while prone within 5 seconds of rattle sound being presented.

(2) Turns Head
Child, while holding his head up, at least 15 cm. off mat will turn it 15 cm to R and L within 5 seconds of being told to "look" and offered a toy in view.

3. Head Control Supine (on back)

A. Child will hold his head 5 cm. off floor for 15 seconds while supine if he is looking at a toy or examiner (E) with 5 seconds or being told to "look".

B. Child will lift his head off floor 5 cm. within 5 seconds of being told to "look" and offered a toy within view.

(1) Lifts Head
Child will lift his head momentarily 5 cm off floor within 5 seconds of being told to "look" and offered a toy held 20-30 cm. in front of his face.

C. Child will turn his head from side to side while holding it up 5 cm. off floor supine within 5 seconds of being told to "look" and offered a toy within view.

(1) Moves head side to side
Child will turn head from centre of the body to L or R while supine within 5 seconds of rattle on either side

4. Rolling

A. Child will roll from back to stomach both to R and to L within 5 seconds of being told "come here". He will begin to move by turning head and turn actively moving arm and leg in sequence.

(1) Rolls from side to stomach
Child will roll from side to stomach both to R and L within 5 seconds of being told "come here".

(2) Rolls from side to side to back both to R and L within 5 seconds of calling name from behind child or being told "come here".

B. Child will roll from stomach to back both to R and to L within 5 seconds of being told "come here" or the shake of a rattle placed just out of reach. He will begin movement by turning his head and then actively moving arm and leg in sequence. (P21).

5. Sitting

A. Child will sit on floor with legs straight in front of him and on stool without back rest for 30 seconds each with (a) his back straight (b) unassisted (without using his hands to hold or touch floor or chair) (c) his head straight and in good alignment with trunk if told to "look here" or while attending to a toy or person within 5 seconds of command (p29).

(1) Head erect
Child will hold his head erect without head or neck support for 30 seconds if in supported sitting position if he is told to "look" and shown a toy or person's face within 5 seconds of command.

(2) Sit with maximum body support
Child will sit on floor or in small arm chair or car seat for 30 seconds if he is supported on both sides and back if he is looking at toy or person's face after being placed in position.

(3) Holds head steady when carried
Child will hold his head steady while being carried in upright position with full trunk support for 30 seconds if he is looking at toy or person and told to "look" within 5 seconds of command.

(4) Sits with minimum support
Child will sit on floor with back against wall or in chair with back rest for 30 seconds if he is told to "sit" and is looking at toy in front of him after being placed in this position.

(5) Sits self-supported on floor
Child will sit on floor with his legs out stretched by supporting himself with his hands for 20 seconds after being placed in the position and told to "sit" while looking at toy. His back may be rounded with his head slightly forward.

Bi. Child will come to sitting from lying on floor by rotating and pushing himself up to sitting on floor within 5 seconds of being told to "sit up" and offered a toy within view of his sitting position (P27)

(1) Rights self
Child will right his head while in trunk supported sitting position if he is tilted 8 cm. in any direction. This should be an immediate response.

(2) Turns head freely in sitting
Child will turn his head freely to both sides while sitting in trunk supported position if he is looking at an object 30 cm. away that is moved from side to side in a 61 cm. arc.

(3) Holds head erect when pulled to sitting
Child will raise his head and hold it steady as he is pulled to sitting position from supine if pulled up slowly.

(4) Comes to sitting with aid
Child will come to a sitting position from lying on back by pulling himself straight up without rotation while holding onto examiner's hands. E may assist child by pulling his hands toward sitting position within 5 seconds of being told "sit up".

Bii. Child will sit on a stool without a back from standing by bending his knees and lowering himself to seat within 5 seconds of being told to "sit down". (P53)

(1) Pulls self to sitting
Child will pull himself to a sitting position from supine while holding onto the tester's thumbs which E holds stationary within 5 seconds of being told to "sit up". He will come straight up without rotation.

(2) Lowers self to sitting
From standing and holding object, child will lower himself to sitting in chair within 5 seconds of being told to sit down.

C. Child will from a sitting position turn to his side and lower himself to his back when told to "lie down" within 5 seconds of command. (P26).

6. Controls Drooling

A. Child will control saliva so that his mouth and chin do not need wiping.

(1) Held supine in E. arms and fed from a bottle child will suck for 10 consecutive seconds and swallow liquid food.

(2) Child will suck in and swallow small dab of semi-liquid food placed on his lower lip within 3 seconds of it being placed there.

(3) Child will wipe his mouth and face if wet within 5 seconds of it becoming wet.

7. Crawling

A. Child will hold self in hands and knees position with (a) hands open and fingers forward, (b) back flat, (c) head looking in direction of movement - when being placed in this posture and told to "look up" while attending to a toy or person at eye level in front of him, within 5 seconds of command.

(1) Child will hold head up when prone with
(a) weight supported on open hands
(b) fingers pointed forward
(c) elbows straight commencing the activity within 5 seconds of the command "look up" and maintaining the position for 5 seconds.

(2) Child will sit back on heels with
(a) weight supported on open hands
(b) fingers pointed forward
(c) hands directly under shoulders
(d) head looking forward within 5 seconds of the command "look up" and maintaining the position for 5 seconds.

Bi. Child will assume above posture by rising from prone (on abdomen) on command "get up" or to get a toy held 91 cm. away within 5 seconds of initiation of activity.

(1) Child will push self from prone position on elbows to prone with arms straight with hands open, fingers forward and head in mid-line looking straight ahead. Child will assume the position within 10 seconds of command "Get up".

(2) Child will push self up from prone position to sitting back on heels with arms straight, hands open fingers forward head in mid line looking straight ahead. Child will assume the position within 10 seconds of command "Get up".

Bii. Child will assume above posture by turning from sitting on floor to hands and knees on command "crawl" or to look at a toy within 5 seconds of initiation of activity. (P32)

C. Child will crawl 3.5m with reciprocal pattern within 5 seconds of being offered a toy or told "crawl" (P30)

(1) Creeps on abdomen
Child will move along on abdomen using arms to propell 1.5m within 5 seconds of command "come here" or to get a toy.

(2) Rocks on hands and knees
Child will rock forward and back in hands and knees posture after being placed in posture on command "rock back and forth" for 30 seconds.

8. Walking

A. Child will stand for 30 seconds unsupported with (a) head up, (b) back straight, (c) hips extended so hip joint is straight above ankle joint, (d) knees not hyperextended (no recurvature), (e) feet externally rotated 10° to 40°, (f) feet hip distance apart - when placed in this posture within 5 seconds of being told to "stand up" while attending to a toy or person at eye level in front of him.

(1) Child will bear weight on his feet with his knees in neutral position or slightly flexed for 30 seconds if his trunk is supported and his feet are placed flat on floor in standing position on command "stand up" or while attending to object.

(2) Stands self-supported when holding a stable object (desk or chair) with 2 hands within 5 seconds of the command "stand up" and being stabilized in the correct standing posture by E. Child will stand for 20 seconds. (P35)

(3) Stands self-supported when holding a stable object (desk or chair) with 1 hand within 5 seconds of the command "stand up" and stabilized in the correct standing posture by E. Child will stand for 20 seconds (P35).

(4) Child will stand self-supported when holding one end of a 60 cm. flexible hose with one hand (E. holds opposite end of hose) after being stabilized in the correct standing posture by E. within 5 seconds of the command "stand up". Child will stand for 20 seconds.

(5) Child will stand unsupported for 5 seconds after being stabilized in the correct standing posture by E. and given the command "stand up".

(6) Child will stand for 30 seconds unsupported after being stabilized in the correct standing posture within 5 seconds of the command "stand up".

(7) Child will stand for 30 seconds unsupported with his knees in neutral or slightly flexed position after being stabilized in the correct standing posture within 5 seconds of the command "stand up"

(8) Child will stand unsupported with back straight for 30 seconds with (a) knees in neutral or slightly flexed position, (b) back straight after being stabilized in correct standing posture within 5 seconds of the command "stand up".

(9) Child will stand unsupported with his feet hip distance apart for 30 seconds with (a) knees in neutral or slightly flexed position, (b) back straight and (c) feet hip distance apart after being stabilized in the correct standing posture within 5 seconds of the command "stand up".

(10) Child will stand unsupported with head up for 30 seconds with knees in neutral or slightly flexed position, back straight, feet hip distance apart and head up after being stabilized in correct standing posture within 5 seconds of the command "stand up".

(11) Child will stand unsupported for 30 seconds with hips extended to neutral position with knees in neutral or slightly flexed position, back straight, feet hip distance apart, head up after being stabilized in correct standing posture by E. within 5 seconds of the command "stand up".

(12) Child will stand unsupported for 30 seconds with knees in neutral or slightly flexed position, back straight, feet hip distance apart, head up, hips extended to neutral and feet externally rotated 10°-40° after being stabilized in correct standing posture by E. and within 5 seconds of the command "stand up".

Bi. Child will stand up from chair without using his hands (if feet touch floor while sitting in chair) in response to "stand up" or to get a toy held above and in front of him within 5 seconds.

(1) Child will put his feet flat on floor in weight bearing position within 5 seconds if trunk is supported in standing position on command "stand up" or while attending to object.

(2) Child will pull himself to standing from sitting in a chair by pulling on a stable object with 2 hands within 5 seconds of the command "stand up".

(3) Child will pull himself to standing from sitting in a chair by pulling on a stable object with 1 hand within 5 seconds of the command "stand up".

(4) Child will pull himself to standing from sitting in a chair by pulling with one hand holding a 60 cm. flexible hose, the other end being held by the E. within 5 seconds of the command "stand up".

Bii. Child will stand up from supine unassisted with rotation in response to "stand up" or get a toy held above and in front of him within 5 seconds.

(1) Child will stand up from sitting on the floor by pulling up on furniture within 5 seconds of the command "stand up".

C. Child will walk 6m. in 30 seconds maintaining above posture (a) without losing his balance, (b) using a heel-toe gait (i.e. steps on heel first and rolls to flat foot followed by toe push off), (c) having reciprocal arm swing opposite to "heel-strike" foot - - within 5 seconds of command "walk" or to get a toy on hard floor or carpeting.

(1) Child will walk designated distance (60 cm., 1.5m, 3.5m) while holding onto a stationary object with both hands within 5 seconds of the command "walk".

(2) Child will walk designated distance (60 cm, 1.5m, 3.5m) while holding onto E finger with one hand (E. finger should be below childs shoulder level) within 5 seconds of the command "walk".

(3) Child will walk designated distance (60 cm, 1.5m, 3.5m) while holding onto a 30 cm. flexible hose with one hand E. holding other end and within 5 seconds of the command "walk".

(4) Child will walk designated distance unsupported within 5 seconds of the command "walk".

(5) Child will walk 6m. in 30 seconds maintaining correct standing posture without lossing his balance within 5 seconds of the command "walk".

(6) Child will walk 6m. in 30 seconds maintaining correct standing posture without loosing his balance and bending both knees in a co-ordinated gait within 5 seconds of the command "walk".

(7) Child will walk 6m. in 30 seconds maintaining correct standing posture without loosing his balance bending both knees in a co-ordinated gait and using a heel-toe gait within 5 seconds of the command "walk".

(8) Child will walk 6m. in 30 seconds maintaining correct standing posture without loosing his balance, bending both knees in co-ordinated gait, using heel-toe gait and using a reciprocal arm swing opposite to "heel-strike foot" within 5 seconds of the command "walk".

9. Stairs

A. Child will walk up 4 stairs unassisted (a) using only the handrail as support, (b) one foot on each stair, (c) facing straight up stairs within 5 seconds of being told to "walk up" and offered a toy at top of stairs. (P76)

(1) Crawls up stairs
Child will crawl up 4 stairs within 5 seconds of being told to "go up" or "come here" and offered a toy at the top.

(2) Walks up with aid
Child will walk up 4 stairs (a) using handrail on one side and holding E hand on the other side, (b) two feet on each step within 5 seconds of being told "walk up" and offered a toy at the top of the stairs.

(3) Walks up curb
Child will walk up a 15 cm curb unassisted within 5 seconds of being told to "step up" and offered a toy.

B. Child will walk down 4 stairs unassisted, (a) using only the handrail as support, (b) one foot on each stair, (c) facing straight down stairs (no trunk rotation) within 5 seconds of being told "walk down" and offered a toy at the bottom of the stairs.

(1) Crawls down stairs
Child will crawl down 4 stairs backwards (feet first) within 5 seconds of being told to "come down" and offered a toy at the bottom.

(2) Walks down with aid
Child will walk down 4 stairs (a) using handrail on one side and holding E hand on the other side, (b) two feet on each step within 5 seconds of being told "walk down" and offered a toy at the bottom of the stairs.

(3) Walks down curb
Child will walk down 15 cm curb unassisted within 5 seconds of being told to "step down" and offered a toy.

10. Running

A. Child will run 9 m with (a) consistent periods of non-support (b) knee of nonsupport leg bent more than 90° from side view, (c) foot placement near line (5 cm either side of a 2.5 cm. line) (d) arms in opposition to legs - elbow bent on command "run".

(1) Run 10 steps
Child will run 10 steps in random fashion when told to "run" and offered a toy within 5 seconds of command.

(2) Negotiates curves
While running, child can negotiate a 90° curve in a four-foot wide course loosing his balance or touching the walls when told to "run" and following the E. who is running in front of him.

(3) Run smoothly with acceleration and deceleration
Child can run in a straight line, accelerating when told "run faster" and decelerating when told "run slower" without loss of balance or continuity of movement within 5 seconds of command.

11. Sitting·Motions and Activities

(1) Child will sit on rocking horse or rocking chair for 30 seconds with his trunk supported by both of E. hands when told to "sit" after being placed there.

(2) Child will sit on rocking horse or chair unassisted for 30 seconds after being placed there and told to "sit" - his back must be straight with his head up.

(3) Child will sit on tricycle unassisted with his back straight and head up for 30 seconds after being placed there and told to "sit".

(4) Child will sit on swing in erect posture and hold ropes with both hands if swing is to height that he can touch the ground with his feet for 30 seconds when told "sit" after being placed there.

(5) Child will sit up straight unaided on a slide for 10 seconds when told to "sit" after being placed there within 5 seconds of command.

. . . . . . . . .

(1) Child will get on rocking horse or into rocking chair with his trunk supported by both of E. hands when told "get on horse" or "get in chair" within 5 seconds of command.

(2) Child will get on rocking horse or rocking chair unassisted when told "get on horse" or "get in chair" within 5 seconds of command.

(3) Child will get on tricycle unassisted within 5 seconds of being told to "get on your tricycle.

(4) Child will sit down on swing (appropriate height) unassisted within 5 seconds of being told "sit down on swing".

(5) Child will mount a 1.5 m slide and sit down at the top unassisted within 5 seconds of being told "you slide".

(1) Child will sit on rocking horse or rocking chair with his trunk supported by both hands of E. and rock forward and back for 30 seconds when told to "rock".

(2) Child will rock forward and back on rocking horse for 30 seconds unassisted when told to rock, within 5 seconds of command.

(3) Child will pedal tricycle 10 feet unassisted when told "come here" with E 10 feet in front of child within 5 seconds of command.

(4) Child will swing on swing unassisted for 30 seconds after being told to "swing on swing" within 5 seconds of command.

(5) Child will slide independently down a 1.5 m slide after being told to "slide down" within 5 seconds of command.

12. Hopping

A. Child will hop at least 5 hops on the left foot and 5 hops on the right foot unassisted within 5 seconds of command "Hop" in a manner characterized by (a) an upright carriage of the upper body above the support leg, (b) keeping the nonsupport leg near the mid line of the body and slightly flexed so that the foot is close to the floor (5-10 cm.) and behind the support foot (c) both arms lifting in front of the body during push-off phase of action; elbows are bent.

(1) Stands on one foot with aid
Child will stand on one foot supporting himself by holding E. hand or with his hand on chair back for 3 seconds when told "hold your foot up". He must do this on both R and L feet within 5 seconds of command.

(2) Stands on one foot without aid
Child will stand on one foot without aid for 3 seconds within 5 seconds of command "hold your foot up". He will do this on both R and L feet.

(3) Child will kick a ball rolled towards his foot from a distance of 91 cm. without loosing his balance, within 5 seconds of being told "kick the ball".

(4) Hops with aid
Child will hop on one foot 5 hops (R and L) while holding E. hand or onto chair back with one hand within 5 seconds of being told to "hop".

(5) Hops without aid
Child will hop forward on one foot 5 hops unaided on command "hop" to get a toy a reasonable distance in front of him within 5 seconds of command.

13. Advanced Locomotion

(1) Forward somersault with aid
Child will squat down into tucked position, put his hands and head on mat and roll over with assistance of E. within 5 seconds of being told "do a somersault". E. will guide child between shoulders with a little push on his rear.

(2) Jumps from height of 30 cm.
Child will jump with both feet together from a height of 30 cm. landing on both feet without loosing his balance within 5 seconds of command "jump down".

(3) Jumps forward
Child will jump forward 25cm (both feet off floor simultaneously) and land without loosing his balance within 5 seconds of command "jump forward".

(4) Begins to skip
Child will skip on at least one foot, one skip within 5 seconds of tester telling him to "skip" and demonstrating a skip.

(5) Skips
Child will skip 10 consecutive skips in a manner characterized by (a) repetition of the step and hop on alternate feet along a straight line, (b) arms moving in opposition to legs at about waist level, (c) a smooth flowing transfer of body weight from one leg to another along a straight line within 5 seconds of being told "skip over here".

(6) Somersaults without aid
Child will do a forward somersault independently without rolling to either side within 5 seconds of being told "do a somersault".

## Criterion Referenced Assessment Guide

## Development of Self-Help Skills

### 1. Dressing - Puts on Clothing

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(1) Puts hat on (P20)

(2) Puts shoes on (P35, 54, 67)

(3) Puts socks on (P21)

(4) Puts pants on

(5) Puts jacket/coat on

(6) Puts T-shirt on.

### Takes off Clothing

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(1) Takes hat off (P20)

(2) Takes shoes off (P24)

(3) Takes socks off (P32)

(4) Takes pants off (P27)

(5) Takes jacket/coat off (P26)

(6) Takes T-shirt off

Fasteners - Undoes

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(1) Unzips clothing

(2) Unbuttons clothing

(3) Unsnaps clothing

(4) Unhooks clothing

(5) Unbuckles

(6) Unties shoes

Fasteners - Does Up

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(1) Zippers Up (P25)

(2) Buttons up clothing (P61)

(3) Snaps up clothing

(4) Hooks up clothing

(5) Does up buckles

(6) Ties shoes (P58, 62, 73)

## 2. Eating

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| | | | | (1) Sucks liquids (P1, 2, 3, 5, 6) |
| | | | | (2) Swallows strained food (P4) |
| | | | | (3) Chews semi solid foods (P9) |
| | | | | (4) Eats finger foods (P10, 11A) |
| | | | | (5) Uses spoon/fork (P13, 15, 29, 31, 48) |
| | | | | (6) Drinks from glass (P8, 11, 16) |
| | | | | (7) Spreads with knife (P70) |
| | | | | (8) Cuts with spoon/fork |
| | | | | (9) Spears with fork |
| | | | | (10) Cuts with knife (P71) |
| | | | | (11) Drinks with straw (P30) |
| | | | | (12) Pours from pitcher (P44) |
| | | | | (13) Unpeels food |
| | | | | (14) Uses napkin (P43) |
| | | | | (15) Cleans up spilled food |
| | | | | (16) Serves self food (P59, 63, 74) |
| | | | | (17) Eats full meal |
| | | | | (18) Sets table (P75) |

3. Hygiene

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(1) Washes and dries hands/face (P12, 18, 33, 39, 65)

(2) Combs har (P78)

(3) Brushes teeth (P60, 76)

(4) Blows nose (P50, 68)

4. Toileting

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(1) Indicates when wet or soiled (P19)

(2) Uses toilet when placed on it (P22)

(3) Indicates need to go to bathroom (P28)

(4) Asks to go to bathroom

(5) Uses bathroom regularly for bowel movement (P37)

(6) Asks to go to bathroom during day in time to avoid accidents (P40)

(7) Labels bladder and bowel functions differently (P46)

(8) Beginning night bladder control (P51)

(9) Cares for daytime toileting needs (P56)

(10) Bladder control at night (P66)

(11) Demonstrates independence with toileting (P77)

## Dressing - Puts on Clothing

(1) Given a hat by the E. the child will put it on his head within 5 seconds of the command "Hat on _____", on 2 out of 3 trials. (P20)

(2) The child will put a shoe on the correct foot when the laces are untied and loosened, the shoe placed in front of his foot and the correct foot indicated by the E. with the command "Shoe on". The child will commence the activity within 5 seconds of the command and complete the task within 30 seconds. (P35, 54, 67)

(3) The child will put a sock on his foot by grasping both sides between thumb and side of index finger when handed the article by E. with the command "Sock on". The child will commence the activity within 5 seconds and complete the task within 30 seconds on 2 out of 3 trials. (P21)

(4) Given a pair of unfolded pants the child will commence putting them on within 5 seconds of the command "Pants on". The task to be completed within 30 seconds on 2 out of 3 trials.

(5) Given an unfastened, open coat the child will commence putting the coat on within 5 seconds of the command "Coat on" and complete the activity within 30 seconds on 2 out of 3 trials.

(6) Given an unfolded T-shirt the child will commence putting it on within 5 seconds of the command "Shirt on". The task to be completed within 30 seconds on 2 out of 3 trials.

## Takes Clothing Off

(1) Given a hat on his head the child will remove it within 5 seconds of the command "Hat off ____" on 2 out of 3 trials.

(2) The child will remove his shoes when laces are loosened within 5 seconds of the command "Shoes off". The task will be completed within 30 seconds on 2 out of 3 trials.

(3) The child will take hold of the loose end of his sock and pull it off the foot within 5 seconds of the command "Sock off". (P21)

(4) The child will pull unfastened pants completely off by stepping out or seated pulling them off over his feet commencing within 5 seconds of the command "Pants off" and completing the activity within 30 seconds. (P27).

(5) The child will remove an unfastened open front coat on command "Coat off", commencing the activity within 5 seconds of the command and completing the task within 30 seconds. (P26)

(6) The child will remove his T-shirt, commencing the activity within 5 seconds of the command "Shirt off" and completing the task within 30 seconds.

Fasteners - Does Up

(1) Wearing a snow suit the child will pull the zipper up from the waist to the neck commencing within 5 seconds of the command "Zipper up" and completing the task within 30 seconds.

(2) Wearing a coat or sweater with large buttons (1.3 cm) the child will grasp the edge of the garment and the bottom with thumb and index finger of each hand and push the button through the hole commencing the task within 5 seconds of the command "Do up this button" and doing up one button in 50 seconds. (B.D.P. Phase XV)

(3) Wearing a jacket or sweater the child will grasp the last snap at the bottom of the garment with thumb and index finger and making a small fold in the material grasps the base snap in the same manner and snaps the two together given the command "Snap up your ____" commencing the task within 5 seconds of the command. (B.D.P. Phase XXV)

(4) Wearing pants with a slide-hook fastener the child grasps one edge of the pants with each hand and inserts hook and fasteners given the command "Do up your hook" commencing the activity within 5 seconds of the command and completing the task within 30 seconds. (B.D.P. Phase XXIII)

(5) Wearing a belt held within belt runners the child will push the belt end through the buckle secure the appropriate hole and push the belt end through the other side given the command "Buckle your belt" commencing the activity within 5 seconds of the command and completing the task within 50 seconds. (B.D.P. Phase XXI)

(6) Wearing a shoe with tightened laces the child will cross the right lace over the left lace, tucking top under bottom lace pulling taut to form a knot. Child brings lace end to middle of lace forming left loop, brings right lace around left loop, pushes under with right finger, grasps and pulls taut. Child will commence tying his shoe in this manner within 5 seconds of the command "Tie your shoe". (B.D.P. Phase XXIV)

## Fasteners - Undoes

(1) Wearing a snow suit the child will pull the zipper down from the neck to the waist given the command "Zipper down" commencing the activity within 5 seconds of the command and completing the task within 30 seconds. (P25).

(2) Wearing a coat or weater with large buttons (1.3 cm.) the child will grasp the edge of the garmet and the button with thumb and index finger of each hand and push the button through the hole within 5 seconds of the command "Undo this button" and undoing one button within 50 seconds. (B.D.P. Phase XI)

(3) Wearing a sweater/jacket the child will undo 4 snaps by pulling with top thumb and index finger commencing the activity within 5 seconds of the command "Open your sweater/jacket" and completing the task within 50 seconds. (B.D.P. Phase XVII)

(4) Wearing pants with a slide hook fastener the child slides the hook forward and out and unfastens given the command "Undo your hook" commencing the activity within 5 seconds of the command and completing the task within 30 seconds. (B.D.P. Phase XXII)

(5) Wearing a belt held within belt runners the child will pull the belt end through the buckle disconnecting it from the tongue and pulling out through the other side given the command "Unbuckle your belt" commencing the activity within 5 seconds of the command and completing the task within 50 seconds. (B.D.P. Phase XIX)

(6) Wearing a shoe the child will pull the end of a lace with one hand, holding other hand still until loops disappear commencing the activity within 5 seconds of the command "Untie your shoe" and completing the task within 30 seconds. (B.D.P. Phase XVIII).

## Eating

(1) Held supine in an adults arms and presented with a bottle the child will suck the nipple for 9-10 seconds once it is placed in his mouth on 2 out of 3 trials. (P2)

(2) Seated on an adults knee and presented with a spoon 1/2 filled with strained food the child will remove the food from the spoon by a sucking motion when it is placed in his mouth on 2 out of 3 trials. (P4)

(3) Seated on an adults knee and presented with a bite sized piece of banana or cookie the child will chew and swallow the piece of food after it is placed in his mouth by E. on 2 out of 3 trials. (Food items may be substituted should they be disliked by the child). (P9)

(4) Seated on an adults lap at a table the child will take a bite sized piece of food placed in front of him, put it in his mouth, chew and swallow it on 2 out of 3 trials (trials will be spread over 3 days he will not be given 3 pieces of food at once). (P10)

(5) Seated with a dish of food in front of him the child will grasp the spoon/fork and transport food from the dish to his mouth and return the utensil to the dish within 5 seconds of the command "Eat your___" and on 2 out of 3 trials. (P15, 29, 31, 48)

(6) Seated at a table the child will pick up a glass 1/4 full of liquid, bring the glass to his mouth, drink and set down the glass to the table with minimal spillings (no more than 1/4 of contents) commencing the activity within 5 seconds of the command "Drink your _____" on 2 out of 3 trials. (B.E.P. Phase VI)

(7) Seated at a table the child will spread soft buttor or topping with a table knife on bread or toast within 5 seconds of the command "Spread the _____" on 2 out of 3 trials. (P70)

(8) Seated at a table and presented with a small plate (side plate) and a spoon/fork and food the child will grasp a spoon/fork press down on the food and cut through the food within 5 seconds of the command "Cut your ____" on 2 out of 3 trials.

(9) Seated at a table and presented with a small plate (side plate) and fork the child will grasp a fork and spear cut up food within 5 seconds of the command "Eat your _____" on 2 out of 3 trials". (Phase IX)

(10) Seated at a table and presented with a knife and a small plate (side plate) containing one of such foods as ground meat, a slice of bread, pancakes, hot dogs or cold cuts the child will grasp the knife, press down with index finger and cut through food within 5 seconds of the command "Cut your ____" on 2 out of 3 trials. (P70, B.E.P. Phase X)

(11) Seated at a table and presented with a glass 1/4 full of liquid and a straw the child will hold the straw between index finger and thumb, put it to his lips and suck once swallowing the liquid commencing within 5 seconds of the command "Drink your ___" and on 2 out of 3 trials. (P30, B.E.P. Phase XI)

(12) Standing beside or seated at a table a small pitcher or single serving milk carton and a glass the child picks up the full pitcher/carton aims and pours into the glass with some spilling (no more than 1/4 of liquid) and returns the pitcher to the table commencing within 5 seconds of the command "Pour your ____ on 2 out of 3 trials". (P44, B.E.P. Phase XII)

(13) Seated at a table and presented with food such as a banana the child will break the skin at the top and unpeel the food commencing within 5 seconds of the command "Peel your _____" on 2 out of 3 trials. (Trials presented on separate days.) (B.E.P. Phase XIII)

(14) Presented with a folded napkin during the meal the child will unfold the napkin and wipe food from face and hands commencing within 5 seconds of the command "Wipe your _____ with your napkin" on 2 out of 3 trials. (P43, B.E.P. Phase XIV)

(15) Having spilled food or liquid during a meal or "juice and cookie break" and presented with a damp cloth the child will wipe up the spilled food commencing within 5 seconds of receiving the cloth and given the command "Wipe up your _______" on 2 out of 3 trials.

(16) Seated at a table the child will serve two scoops of two different kinds of food which are on the table commencing within 5 seconds of the command "Take some ______" on 2 out of 3 trials when the serving dish is held by either parent or E.

(17) Seated at a table and presented with a full meal (soup, maincourse, desert and beverage) the child will feed himself the full meal changing utensils as required commencing the activity within 5 seconds of the command "Eat your ___" on 2 out of 3 trials (trials to occur at separate meal times).

(18) The child will place 2 settings of dishes, silver, napkins and glasses on the table in the correct positions for use at a meal commencing within 5 seconds of the command "Set the table _____" on 2 out of 3 trials.

## Hygiene

(1) The child will turn on the water wet hands and face, soap, rinse and dry hands and face and dispose of paper towel (or return towel to hanging place) commencing within 5 seconds of the command "Wash your hands and face _____" on 2 out of 3 trials.
(P17, 18, 33, 39, 66, B.H.P. Phase 1, D)

(2) Presented with a comb and a mirror at the appropriate height the child will comb hair forward, make a part, comb hair down to left and right of part to rear on back of head within 5 seconds of the command "Comb your hair _____" on 2 out of 3 trials. (P78, B.H.P. Phase VI,D)

(3) Given a tube of toothpaste and toothbrush the child will apply toothpaste to the brush, brush teeth independently and replace toothpaste and brush commencing within 5 seconds of the command "Clean your teeth ____" on 2 out of 3 trials. (P69, 76 B.H.P. Phase 2, D)

(4) The child will get a facial tissue, blow his nose, wipe clean and place tissue in waste paper basket or his own pocket within 5 seconds of the command "Blow your nose ___" on 2 out of 3 trials. (P50, 68, B.H.P. Phase IV, D)

## Toileting

(1) Child indicates vocally or by gesture that he is wet or soiled. Child to be checked on the hour for the testing period - pass if indicates wet at any time, fail if wet during the hour and did not indicate. Child will indicate when wet on 2 out of 3 trials. (P19).

(2) Child will use pot at least once when placed on it. Child will sit on pot for 5 minutes once every 1-1/2 hours given the commands "Step up" (child steps up on box) "Sit down ___" "Go to the Bathroom" (Child sits on pot 5 mins.) "Stand up" "Step down". (P22)

(3) The child will indicate need to use the pot either gesturally or vocally at least twice daily (spontaneously) or when taken to bathroom by either parent or E. and given the command "Do you have to go to the Bathroom?" whilst approaching the bathroom. Child will indicate need within 5 seconds of the command (or spontaneously) on 2 out of 3 trials. (P28, 34.)

(4) Child will use bathroom regularly for bowel movements and will pull pants down, step up on stool, sit on toilet for 2 minutes (or until eliminates) stand up, step down (parent or E. will wipe child's bottom) and pull pants up commencing within 5 seconds of the command "Go bathroom". The child will perform the entire sequence of toileting activities outlined above on 2 out of 3 trials. (P37).

(5) Child will request to use toilet during the day in time to avoid all accidents. The child will use toilet, assist with wiping self (by pulling paper, folding and wiping, parent or E. will check and complete when necessary) flush toilet and wash hands on 2 out of 3 trials. (P40).

(6) The child will use different words to indicate his need to have a bowel movement or urinate. These words will be used consistently-pass if this occurs on 4 out of 5 consecutive days. (P46)

(7) The child will indicate to the parent that he needs to go to the bathroom during the night or will proceed to use facilities independently. Pass if bed and child are dry on 4 out of 5 consecutive mornings. (P51)

(8) The child will care for daytime toileting needs independently (but may still require assistance with wiping as in #5). May still need to be reminded to go to toilet. Pass if child completes previously sound toileting procedure on 4 out of 5 consecutive days. (P56)

(9) The child will remain dry during the night with only occasional accidents on occasions such as during illness. Pass if child remains dry overnight on 4 out of 5 consecutive days.

(10) Child goes to the bathroom, uses toilet paper appropriately, flushes toilet, washes and dries hands before leaving the room. Child will carry out the above sequence of activities independently. Pass if sequence completed independently on 4 out of 5 consecutive days. (P77, B.T.P. Phase I C)

B.D.P. - Baldwin et al Dressing Program

B.E.P. - Baldwin et al Eating Program

B.H.P. - Baldwin et al Hygiene Program

B.T.P. - Baldwin et al Toileting Program

# APPENDIX B

## HOME PROGRAMS FOR LANGUAGE, COGNITION, MOTOR SKILLS, AND SELF-HELP SKILLS

# EARLY EDUCATION PROJECT

## Program Sheet

### Developmental Area: Language

Behavior Target:

Responds to own name: will respond to own name by turning eyes and head and focusing on the teacher momentarily.

Setting:

Any place with few distractions where is in a good position to make eye contact with you.

Materials:

None.

Procedure:

While is engaged in a play activity, from out of his/her field or vision call name.

(1) Physically guide head with hand to turn and focus on your face.

(2) Physically guide head with one finger to turn and focus on your face.

(3) Use a physical prompt to get to focus on your face. Move your finger from eye level to yours to show him/her what you want.

(4) Give an additional verbal prompt after calling name e.g. "_____ look at me"

(5) Call name i.e. "look here ___________".

NOTE: Refer to Standard Procedures for Teaching Programs for further information.

Review:

Once has reached 3 consecutive trials at a 5 level place on review. Call name once a day for 5 days - wait 5 seconds and score at a 5 it focuses on face 0 if doesn't.

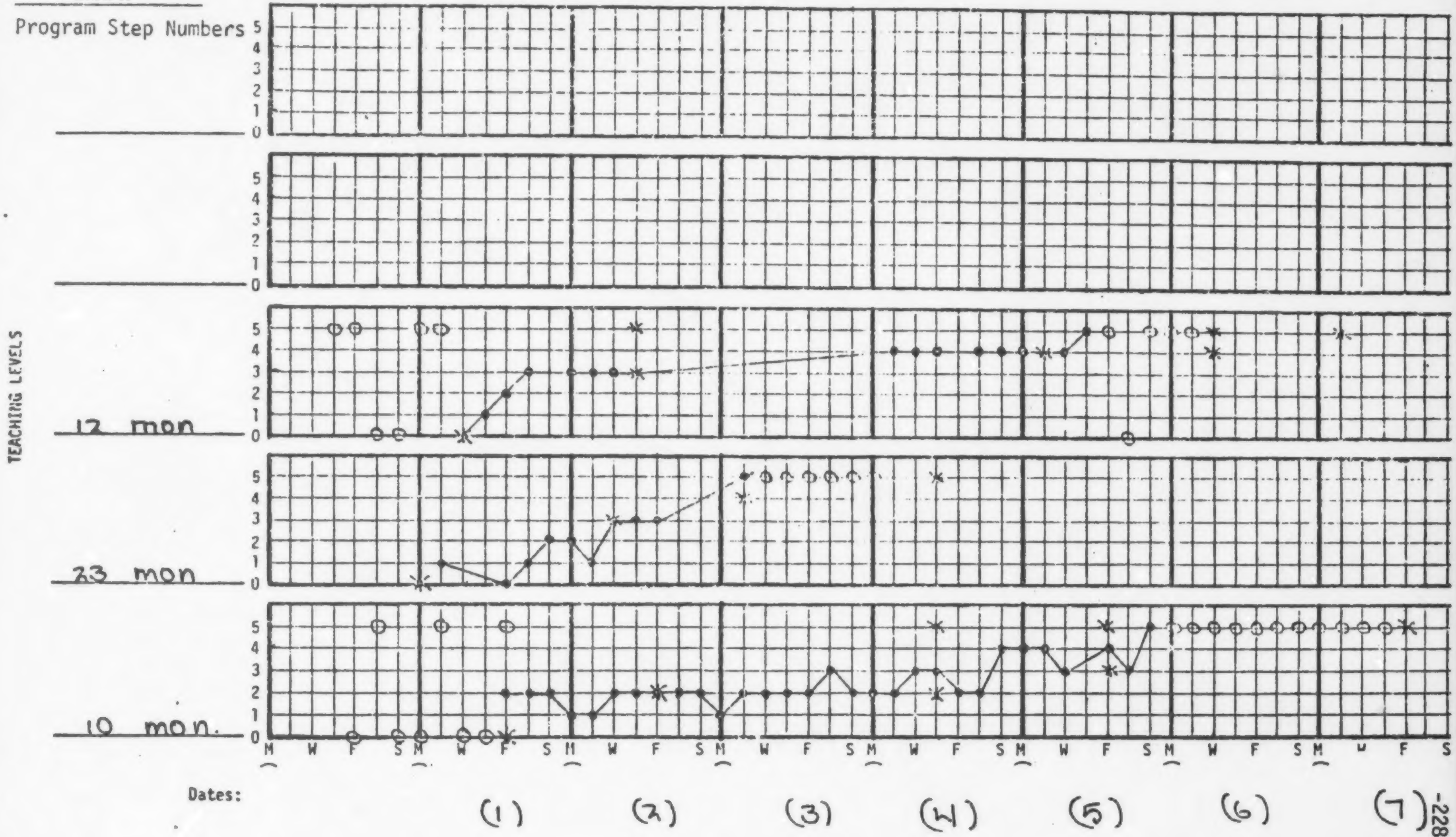
Maintenance:

Once criterion is reached move program to Incidental Teaching Format.

| LEVEL 1 | LEVEL 2 | LEVEL 3 | LEVEL 4 | LEVEL 5 |
|---|---|---|---|---|
| | | | | |
| Call name "Look here____". → | → | → | → | |
| Give additional verbal prompt and physical prompt together → | → | | Give additional verbal prompt only "____look at me". | ☒ |
| Physically guide head with hand to focus on your face | Physically guide head with one finger to focus on your face. | ☒ | ☒ | ☒ |
| | | | | |

TEACHING SESSION GRAPH

Teacher(s) ______________________ Student ______________________



Comments:

Responding to own Name

* teacher probes

# EARLY EDUCATION PROJECT

## Program Sheet

Developmental Area: Language

Behavior Target:

Receptive Language: will point at a named object within 5 seconds of the instruction "show_____" in the presence of 3 distractions (other objects).

Setting:

Sitting at a place with few distractions. Place 4 objects in front of and out of reach.

Materials:

Several different varieties of the 4 objects being taught e.g. different balls.

Procedure:

(a) You will be working on identifying two objects at the same time.

(b) The two objects will be asked for randomly throughout the session (use random order recording sheet).

(c) Between each trial change the position of the 4 objects in relation to one another.

(d) Each session try and vary the objects that you are using e.g. a different ball.

Place the 4 objects out of reach in front of and say "show _____________".

(1) Given maximum physical guidance with your hand to show what you want i.e. use hand to guide pointing at object.

(2) Give minimum physical guidance with one finger to show what you want i.e. use one finger to guide pointing at object.

(3) Give an appropriate physical prompt (model) i.e. point at the object yourself.

(4) Given an appropriate verbal prompt e.g. ball, point to the ball.

(5) Give the instruction "show___________".

NOTE: Refer to Standard Procedures for Teaching Programs for further instructions.

Review:

Once a word or object is learned place it on review (3 consecutive trials at a 5 level). Do once a day at a 5 level for 5 days. If points correctly within 5 seconds score as a 5. If doesn't point correctly within 5 seconds score as a _0_. Start teaching another word from the probes and insert a new probe word.

Probes:

Once each day probe on the other 2 articles. Use the same instruction as above. Give him/her 5 seconds to respond. Score as a _5_ if points correctly and a _0_ if doesn't. Mix the probes in among the teaching trials.

Maintenance:

As each word is learned move it to the Incidental Teaching Program e.g. what want, want______, Pass________, Get me the ________.

| LEVEL 1 | LEVEL 2 | LEVEL 3 | LEVEL 4 | LEVEL 5 |
|---|---|---|---|---|
| Get attention | same level 1 | same level 1 | same level 1 | same level 1 |
| Place 4 objects in front child and say "show_______". | → | → | → | → |
| Give verbal and physical prompts together | → | → | Give verbal prompt only | ☒ |
| Give maximum physical guidance to complete the request | Give minimum physical guidance to complete the request | ☒ | ☒ | ☒ |
|  |  |  |  |  |

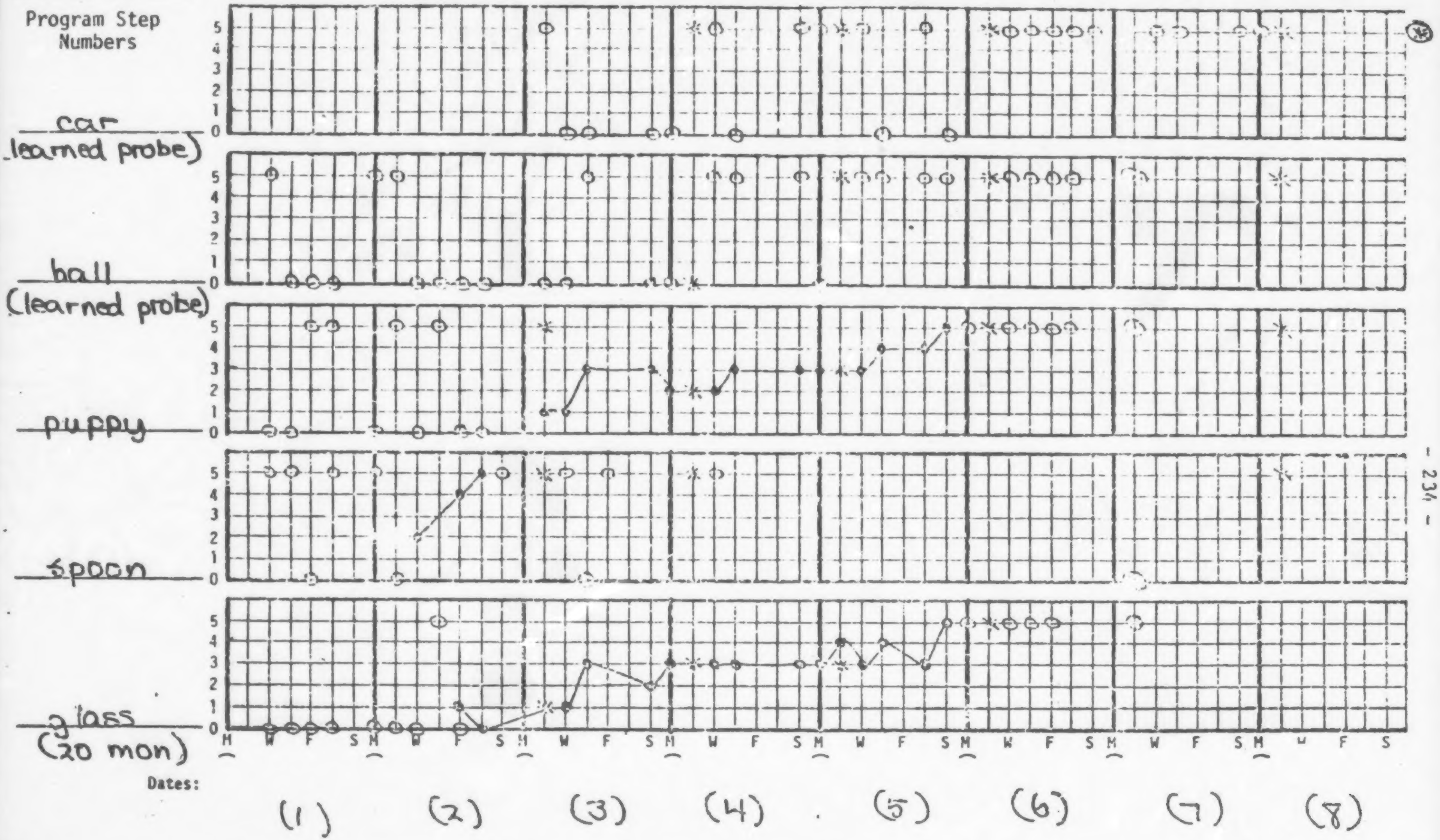
NAME: ______ AREA Language SUMMARY March 27/75

| BEHAVIOR TARGET | CARD NUMBER | BASE-LINE Date | BASE START | DATE REVIEW | DATE MINUTES |
|---|---|---|---|---|---|
| Receptive - Point to with 3 distractors | | | | | |
| * 1) spoon | | 10/11/76 | 17/11/76 | 20/11/76 | 7/12/76 |
| * 2) glass | | 10/11/76 | 19/11/76 | 12/12/76 | 28/12/76 |
| * 3) ball (learned probe) | | 10/11/76 | | 14/12/76 | 18/12/76 |
| * 4) puppy | | 10/11/76 | 23/11/76 | 12/12/76 | 18/12/76 |
| * 5) car (learned probe) | | 23/11/76 | | 14/12/76 | 28/12/76 |
| * 6) hat (learned probe) | | 22/12/76 | | 11/1/77 | 22/1/77 |
| * 7) shoe | | | 16/12/76 | 17/12/76 | 6/1/77 |
| * 8) bowl | | | 16/12/76 | 21/1/77 | 15/2/77 |
| * 9) block | | 16/12/76 | 22/12/76 | 11/1/77 | 22/1/77 |
| * 10) book (learned probe) | | 16/12/76 | | 11/1/77 | 22/1/77 |
| * 11) pencil | | | 11/1/77 | 24/1/77 | 15/2/77 |
| * 12) cookie (learned probe) | | 11/1/77 | | 23/1/77 | 15/2/77 |
| * 13) baby (learned probe) | | 11/1/77 | | 23/1/77 | 15/2/77 |
| * 14) fork | | | 23/1/77 | 28/2/77 | 8/3/77 |
| * 15) bead | | | 24/1/77 | 17/2/77 | 15/3/77 |
| * 16) sock (learned probe) | | 23/1/77 | | 15/2/77 | 8/3/77 |
| 17) box | | 23/1/77 | 16/2/77 | 26/2/77 | 8/3/77 |
| 18) apple (learned probe) | | 15/2/77 | - | 28/2/77 | 8/3/77 |
| 19) T-shirt (learned probe) | | 16/2/77 | | 28/2/77 | 8/3/77 |

* stability index done with novel Items

TEACHING SESSION GRAPH

Teacher(s) ______ Student ______



ents:

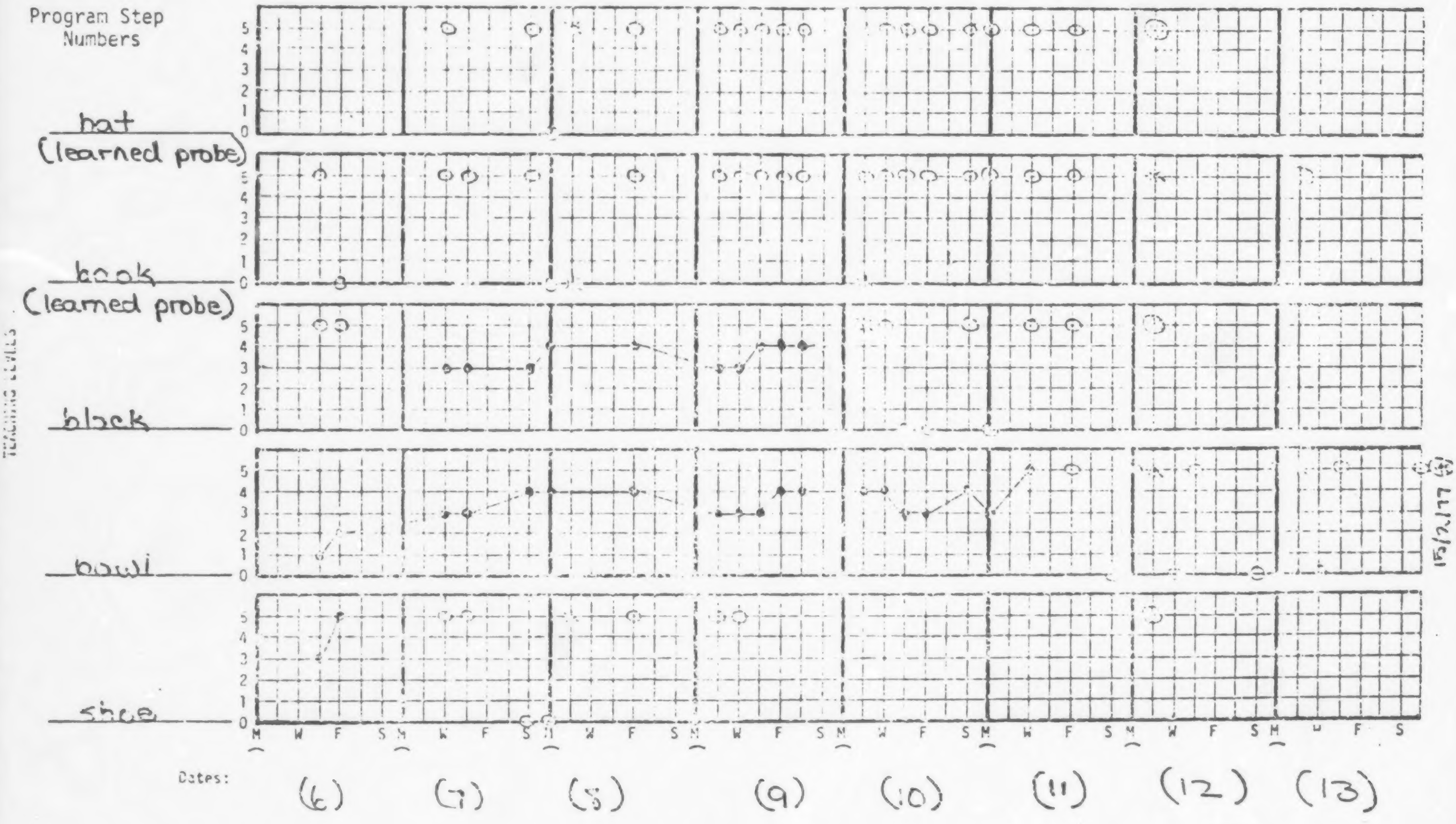
Receptive language - point to

* teacher probe

⊛ stability index

## TEACHING SESSION GRAPH

Teacher(s) ______ Student ______



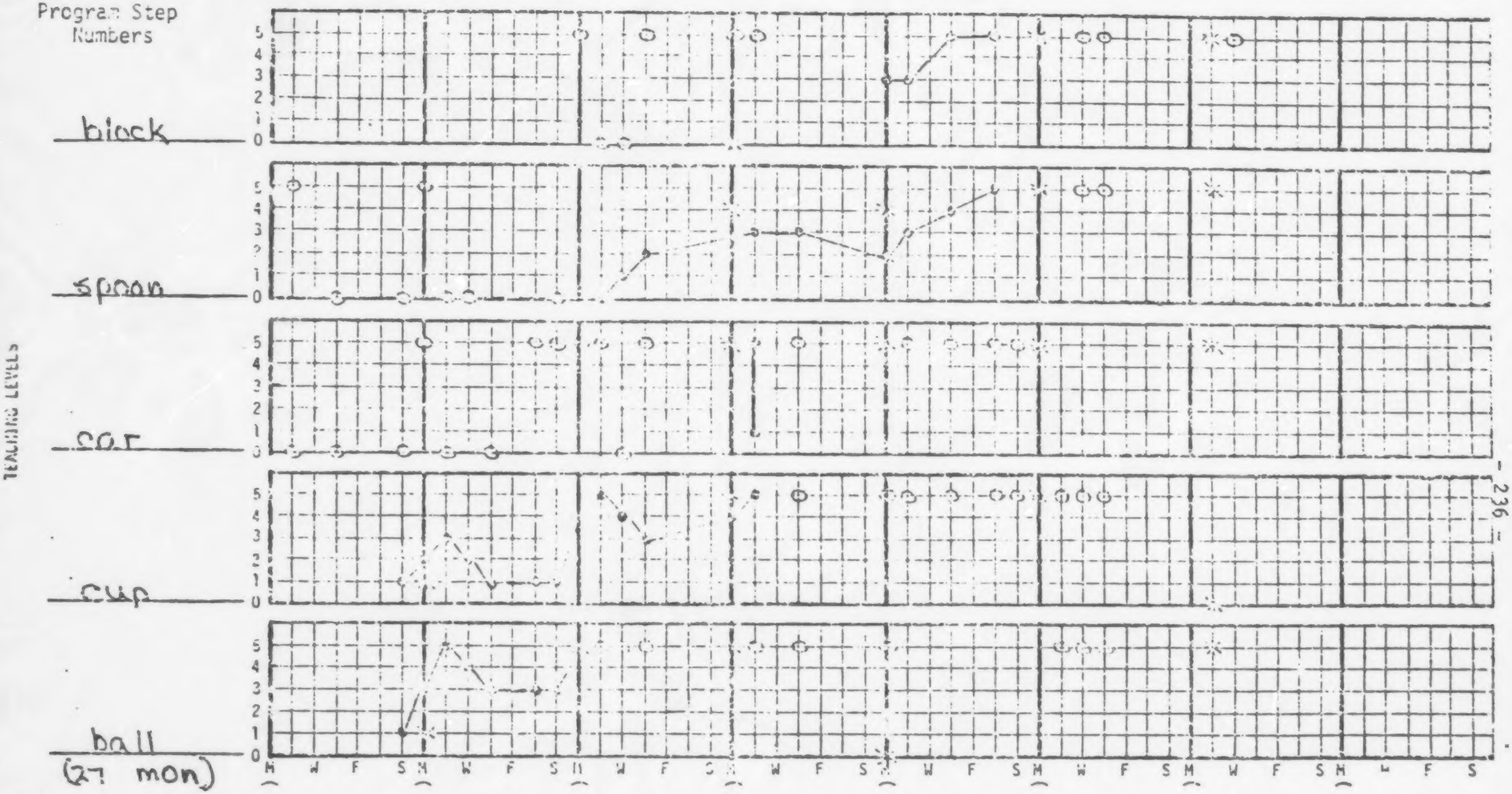
Comments:

Receptive language - point to

* teacher probe

TEACHING SESSION
GRAPH

Teacher(s) ______________________ Student ______________________



Dates: (1) (2) (3) (4) (5) (6) (7) (8)

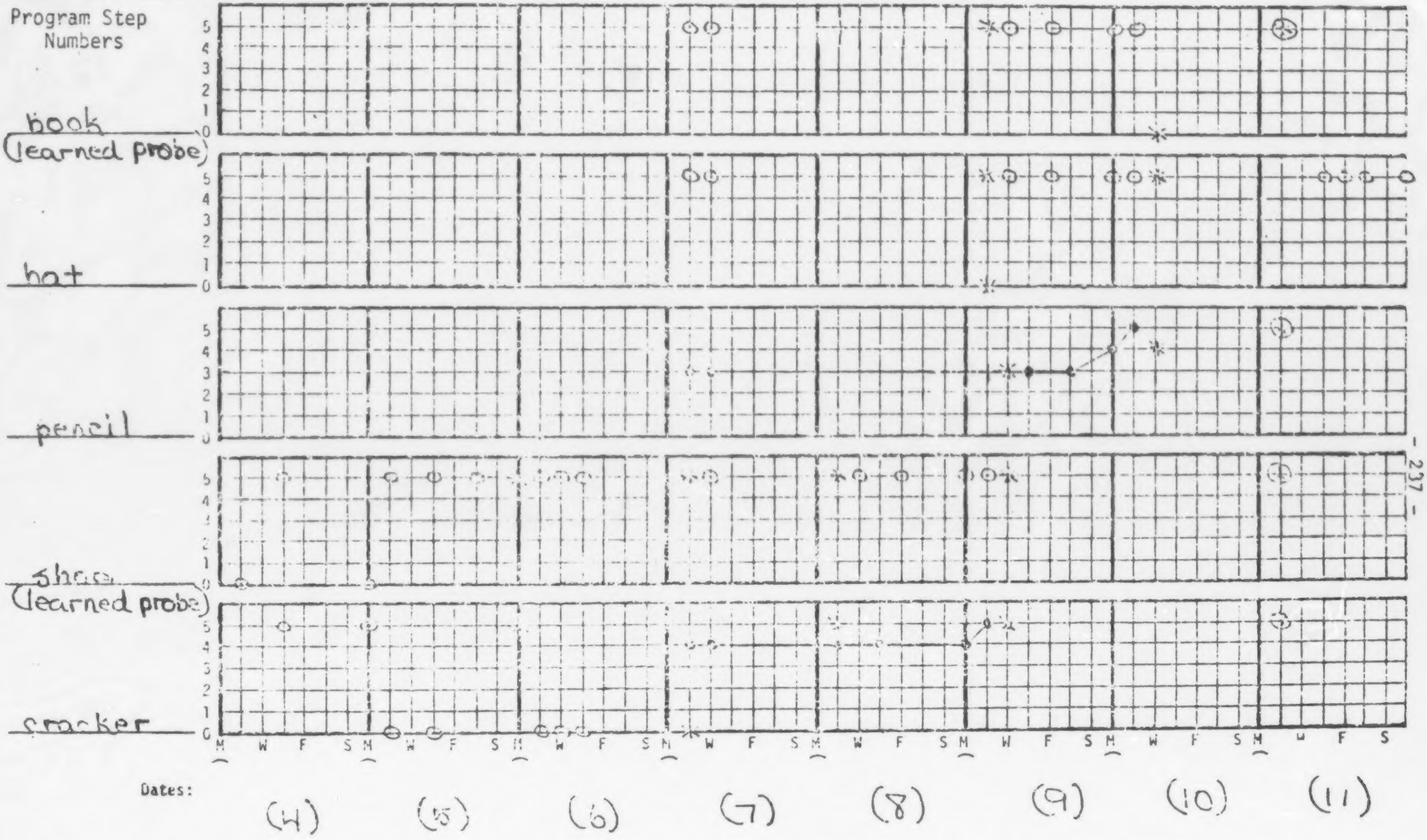
Comments:

Receptive language - point to

* teacher probes

TEACHING SESSION
GRAPH

Teacher(s) ____ Student ____



:ments:

Receptive language - point to

* teacher probes

○ stability index

## EARLY EDUCATION PROJECT

### Program Sheet

### Developmental Area: Cognition

Behavior Target

Reach and grasp stationary object: will reach for and grasp a brightly colored, stationary object that is within reach when lying on back, or sitting in a supported position.

Setting

lying on his/her back, or sitting in a supported position in a place with few distractions.

Materials

A variety of brightly colored objects.

Procedure

Get attention of child (eg. call name). Hold or place the object within reach directly in front of him/her. Say "Take it".

1) Use maximum physical guidance (hand around forearm) to guide hand to object. Place fingers around it if necessary.

2) Use minimum physical guidance (one finger behind hand) to guide hand to touch the object.

3) Use a gesture to get to reach for and grasp the object (eg. hold hand above his/hers and then move to the object so child follows, move the object etc.)

4) Give a sound or verbal prompt to take the object (eg. repeat instruction, make a noise with object, etc.

5) Hold or place the object within reach, directly in front of him/her. Say "Take it".

NOTE: For further instructions please refer to "Standard Procedures for Teaching Programs"

Review

Once criterion reached (3 trials in a row at a 5 level), put on review. Present object once each day at a 5 level. If reaches and graps it within 5 seconds score as a _5_. If doesn't score as a _0_.

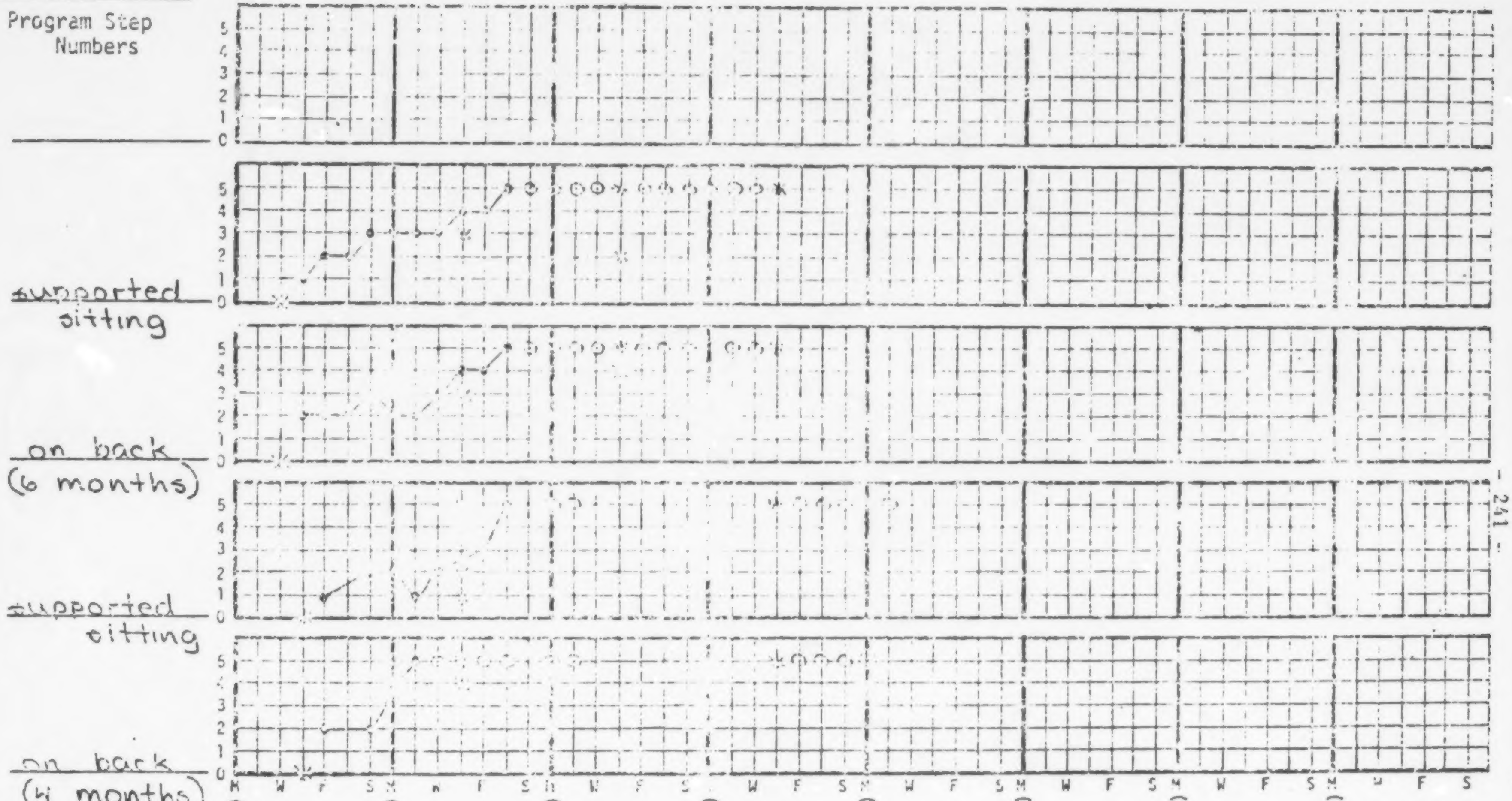
Maintenance

Once criterion is reached move to Incidental Teaching Program. Give opportunities during the day to reach and grasp objects.

| LEVEL 1 | LEVEL 2 | LEVEL 3 | LEVEL 4 | LEVEL 5 |
|---|---|---|---|---|
| Get attention | Get attention | Get attention | Get attention | Get attention |
| Place object within reach and ask to "take it" | Repeat Level 1 | Repeat Level 1 | Repeat Level 1 | Repeat Level 1 |
| Give verbal prompt (sound) and physical prompt together | Repeat Level 1 | Repeat Level 1 | Give verbal Prompt (sound) only | |
| Use maximum physical guidance to guide hand toward object. Place fingers around it if necessary | Use minimum physical guidance to guide hand toward object (1 finger behind wrist). | | | |
| | | | | |

TEACHING SESSION
GRAPH

Teacher(s) ____________ Student ____________



Dates: 1 2 3 4 5

Notes:

Reach and grasp a stationary object

* teacher probes

# EARLY EDUCATION PROJECT

## Program Sheet

## Developmental Area: Cognition

Behavior Target

Cognition operations: will respond appropriately to the instructions put in, put on take off, take out, push, pull, open and close, regardless of the specific objects used within 5 seconds of the instruction.

Steps

1) Child will put one object into another on the instructions "put in" regardless of the objects used.
2) Child will take one object out of another and give it to you on the instruction "Take out and give" regardless of the objects used.
3) Child will put one object on another of the instruction "put on" regardless of the objects used.
4) Child will take one object off another and give it to you on the instruction "Take off and give" regardless of the objects used.
5) Child will push an object appropriately on the instruction "Push" regardless of the objects used.
6) Child will pull an object appropriately on the instruction "Pull" regardless of the objects used.
7) Child will open an object on the instruction "Open" regardless of the objects used.

8) Child will close an object on the instruction "Close" regardless of the objects used.

Setting

Sitting with            in a place with few distractions. Have all your materials handy.

Materials

All items that are listed in individual operation programs to teach that operation.

Procedure

A) A minimum of 5 different objects will be used to teach each of the operations.

B) These will be randomly alternated within each block of trials that are taught.

C) Each activity will be presented at least once within each teaching session.

Place the objects being used in front of            and give the appropriate instruction to him/her. Model operation at levels 1, 2 & 3.

1) Give child maximum physical guidance (your hand over theirs) to complete the operation you are teaching

2) Give child minimum physical guidance (1 finger behind wrist) to complete the operation you are teaching.

3) Give child a physical prompt or gesture to indicate what you want (eg. indicate by pointing what you want).

4) Give a verbal prompt to tell child what you want him/her to do (eg. repeat instruction, give extra information).
5) Give child instruction.

NOTE: For further instructions please refer to "Standard Procedures for Teaching Programs".

Review

Once criterion reached (3 trials in a row at a 5 level) put on review. Present operation once each day (use different materials each day) at a 5 level. If completes the activity within 5 seconds of the instruction score as a 5. If doesn't score as a 0.

Probe

Once each day you will be probing other operations indicated on recording sheet. Materials will be presented and instruction given at a 5 level. If child completes operation correctly within 5 seconds score as a 5. If doesn't score as a 0. Use different materials each day.

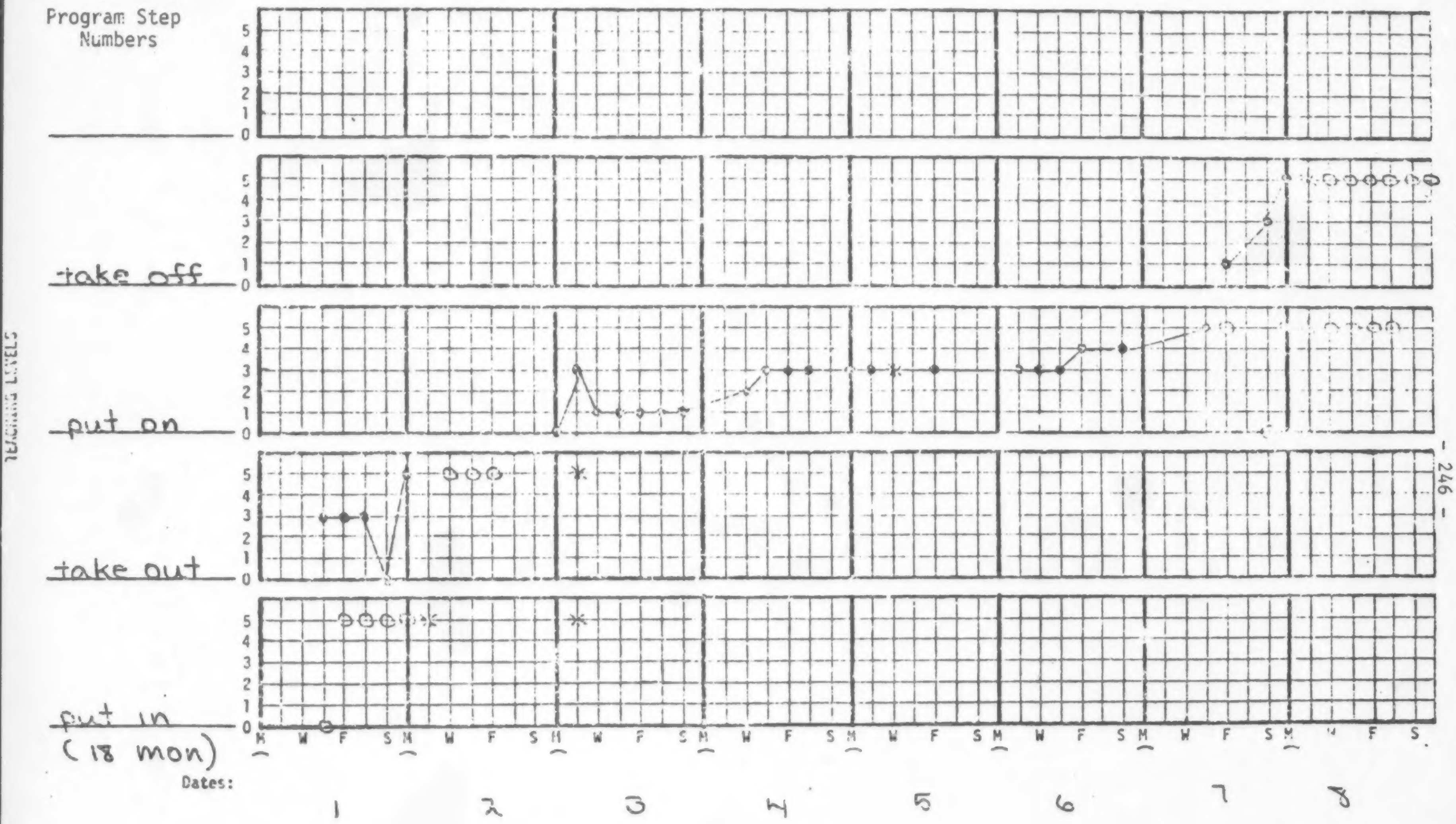
Maintenance

Once criterion is reached move to Incidental Teaching Program. Give opportunities during the day to do the operations learned.

| LEVEL 1 | LEVEL 2 | LEVEL 3 | LEVEL 4 | LEVEL 5 |
|---|---|---|---|---|
| Get attetion | Same Level 1 | Same Level 1 | Same Level 1 | Same Level 1 |
| Place objects in front of child and give instruction with mode. | " | " | Place objects in front of child and give instruction (no model) | Place objects in front of child and give instruction |
| Provide verbal and physical prompts together. |  |  | Give verbal prompt only |  |
| Give maximum physical guidance to complete desired operation | Give minimum physical guidance to complete desired operation (1 finger). |  |  |  |
|  |  |  |  |  |

# TEACHING SESSION GRAPH

Teacher(s) ______________________ Student ______________________



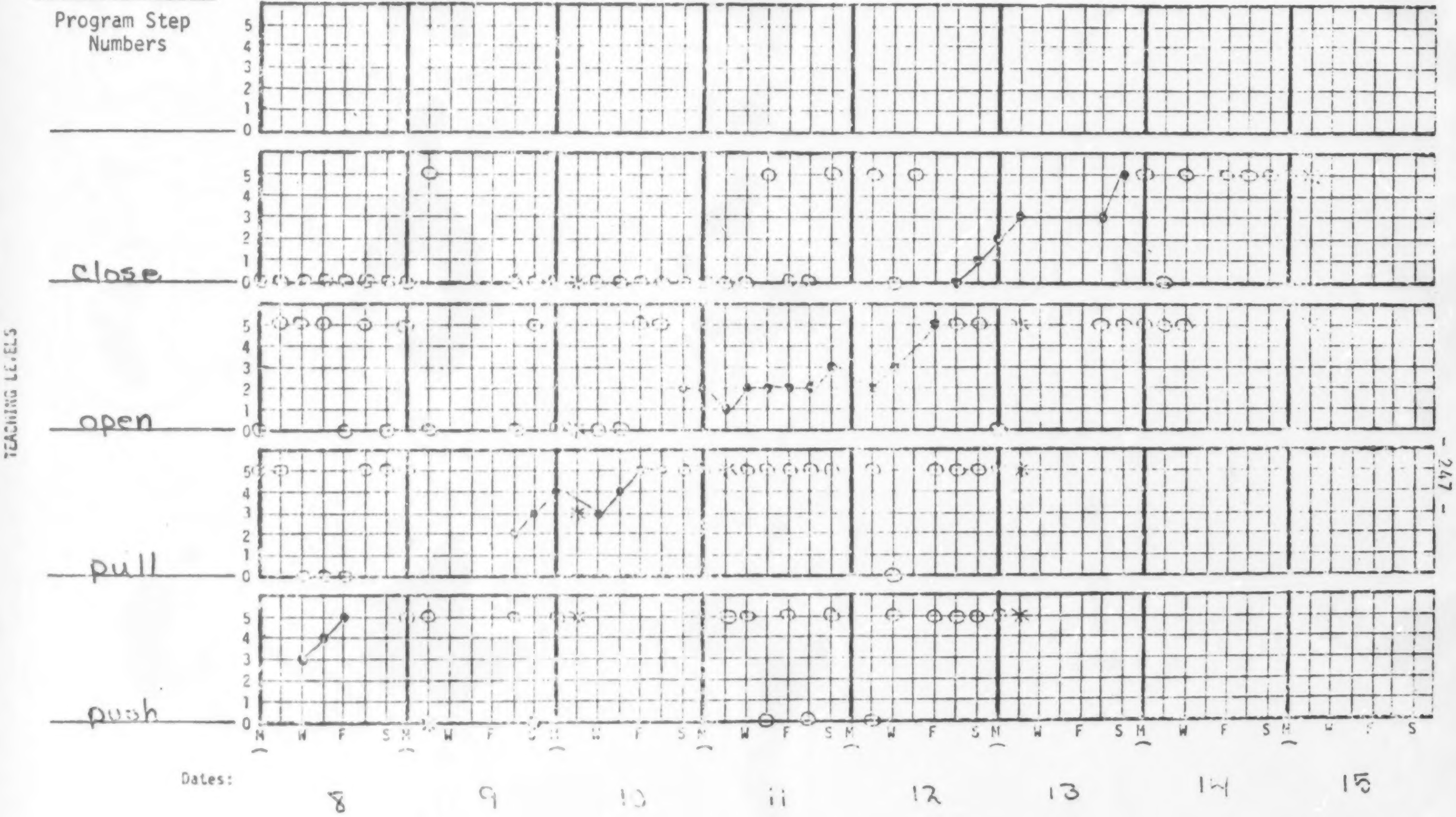
mments:

Operations

* teacher probes

TEACHING SESSION
GRAPH

Teacher(s) ______ Student ______



Comments:

Operations

* teacher probes

TEACHING SESSION GRAPH

Teacher(s) ______ Student ______

Program Step Numbers

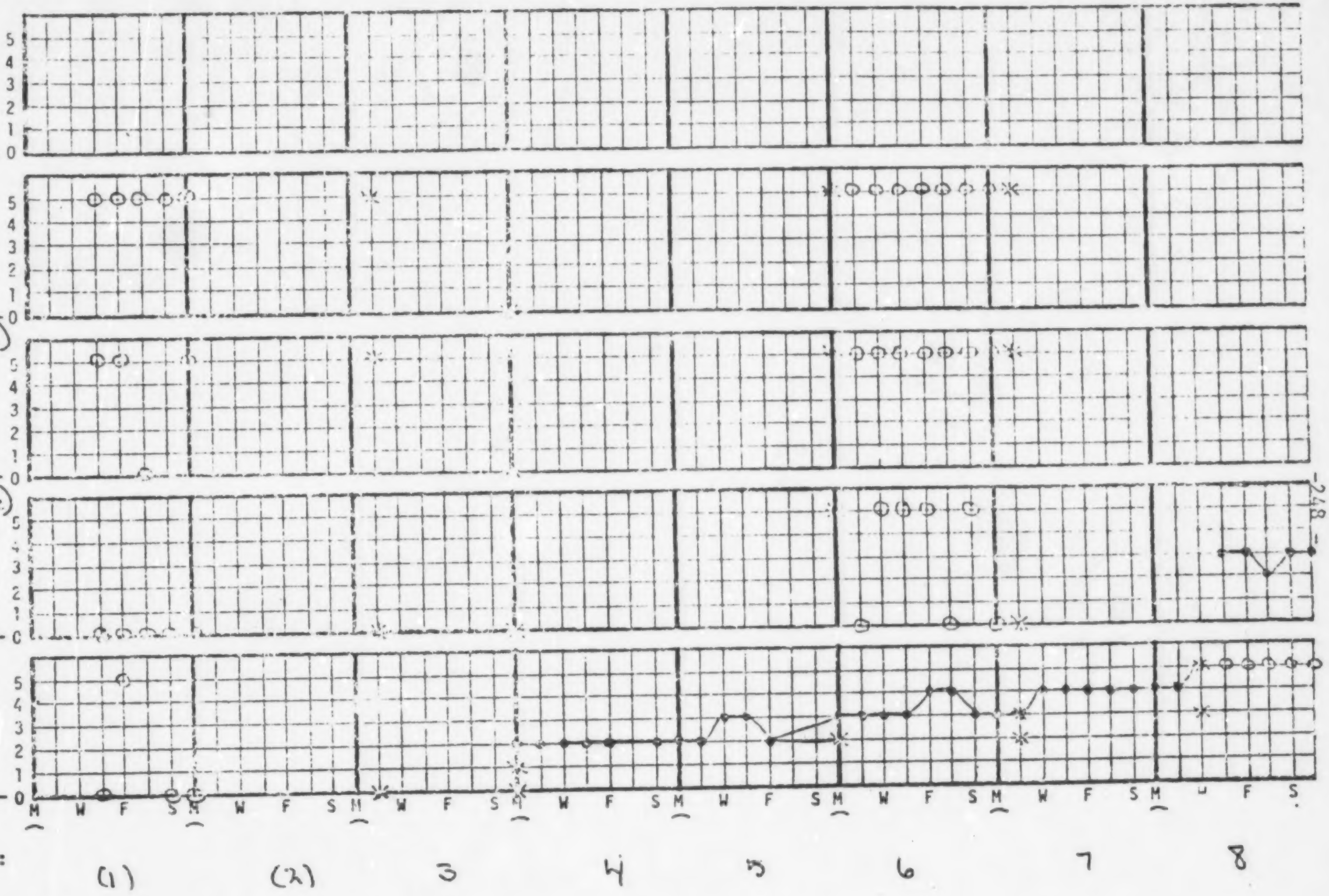
Take off (learned probe)

Take out (learned probe)

Put on

Put in (10 mon.)

TEACHING LEVELS



Dates:

Comments:

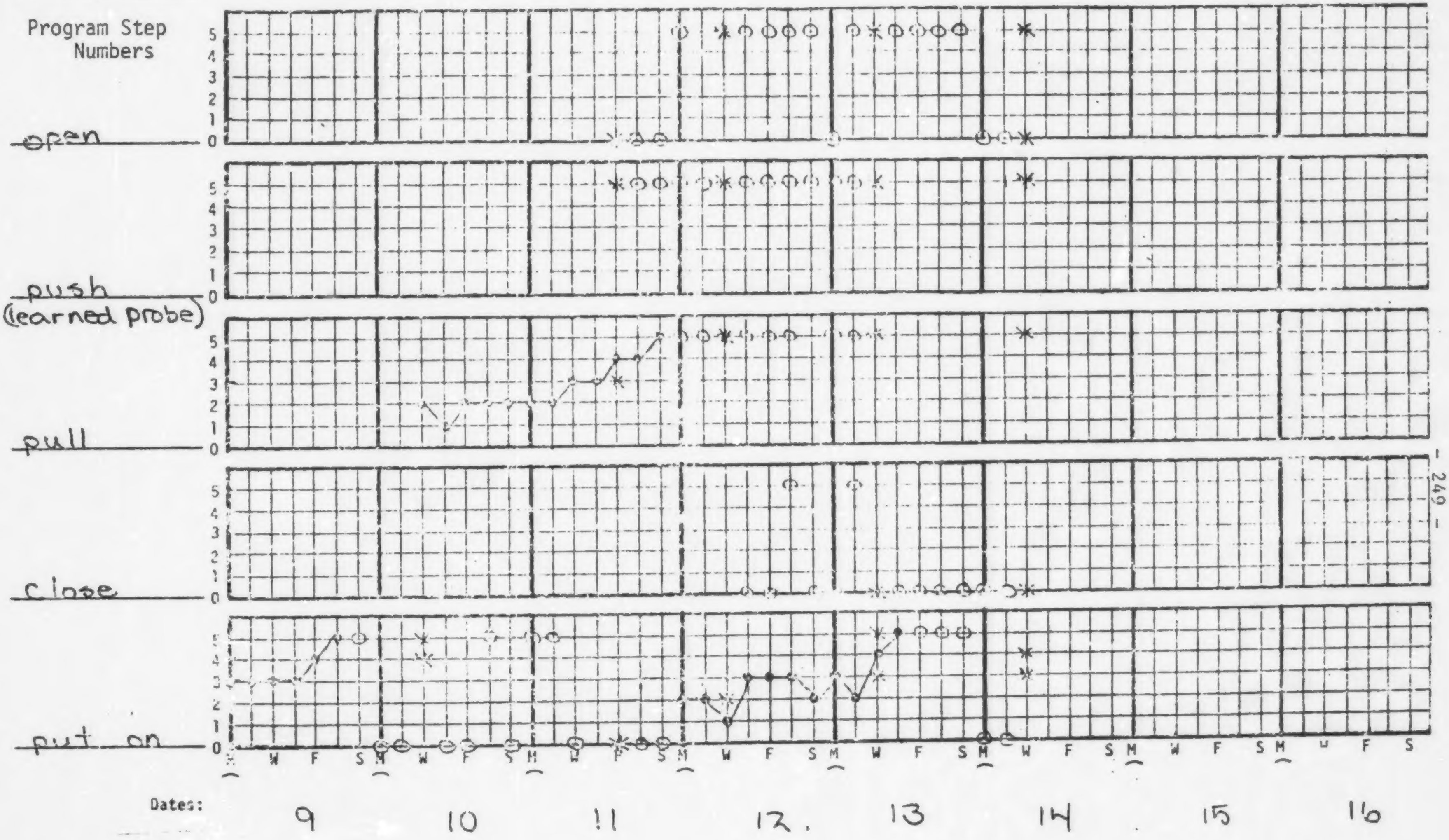
Operations

* teacher probe

F4

TEACHING SESSION
GRAPH

Teacher(s) ______________________ Student ______________________



Comments:

Operations

* teacher probe

# EARLY EDUCATION PROJECT

## Program Sheet

## Developmental Area: Cognition

### Behavior Target

Operations with distractors: will respond appropriately to the instructions put in, put on, take out, take off, push, pull, open and close regardless of specific objects used with 1 distractor present, within 5 seconds of the instruction (distractor: materials that are appropriate for different operation)

### Steps

1) will respond appropriately to the commands "put in" and "put on" when objects for both operations are placed in front of him.
2) Once one operation is learned put it on review and start teaching "take out".
3) Same as #2 for "take off"
4) Same as #2 for "push"
5) Same as #2 for "pull"
6) Same as #2 for "open"
7) Same as #2 for "close"

### Setting

Sitting with in a place with few distractions. Have all of your materials handy.

## Materials

All those materials appropriate for teaching the two operations you are working on. Materials for one can be used as distractors for the other.

## Procedure

A) You will be working on teaching 2 operations, with a distractor present.

B) The two operations will be asked for randomly throughout the session (use random order recording sheets).

C) You will vary the materials you are using for both operations using a variety of activities appropriate to the instruction (as described in previous "operations" programs.

Place materials for 2 activities in front of           . One should be appropriate for one operation you are teaching, the other for the second. Give the appropriate instruction for the operation you are teaching.

1) Give child maximum physical guidance. Guide his/her hand to the activity you want completed and put through it.
2) Give minimum physical guidance. Guide child's hand to the question you want completed.
3) Give child a physical prompt. Point at the materials for the operation you wish completed.
4) Give a verbal prompt for child to choose one of operations and complete it (eg. repeat the instruction).
5) Give the appropriate instruction for the operation you are teaching.

NOTE: For further instructions please refer to "Standard Procedures for Teaching Programs".

### Review

Once criterion is reached (3 trials in a row at a 5 level) put on review. Present materials for learned operation with those of a distracting one once each day. If child responds appropriately to instruction within 5 seconds score as a 5. If doesn't score as a 0.

### Probe

Once each day you will be probing other operations when presented with a distractor as indicated on recording sheet. Materials will be presented and instruction given at a 5 level. If child completes the correct operation within 5 seconds score as a 5. If doesn't score as a 0. Use different materials each day.

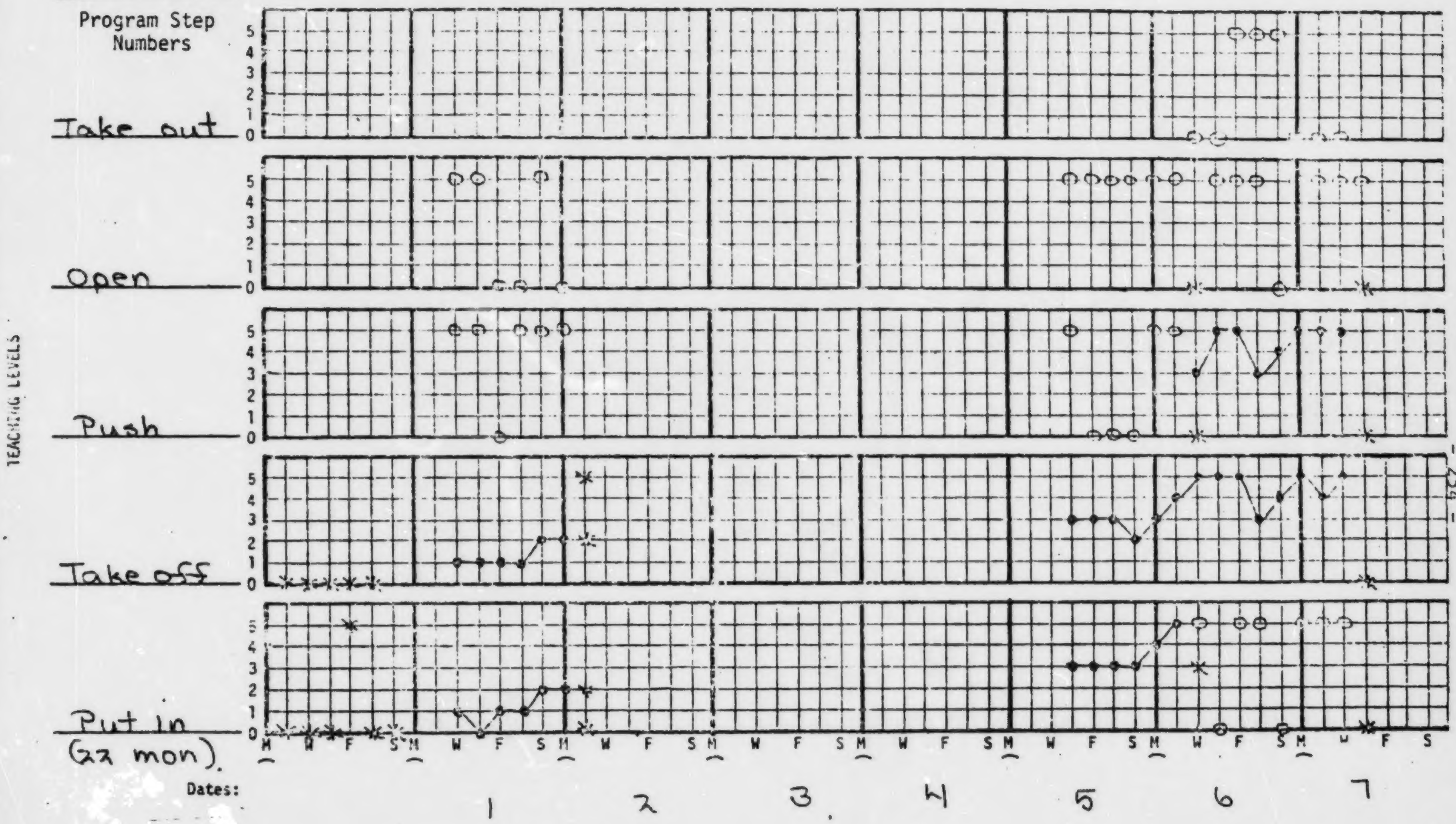
### Maintenance

Once criterion is reached move to Incidental Teaching Program. Give opportunities during the day where he has to choose what you ask to do from another activity.

| LEVEL 1 | LEVEL 2 | LEVEL 3 | LEVEL 4 | LEVEL 5 |
|---|---|---|---|---|
| Get attention | Same Level 1 | Same Level 1 | Same Level 1 | Same Level 1 |
| Place materials for 2 operations and give appropriate instruction | " | " | " | " |
| Give verbal and physical prompts together. | " | " | Give verbal prompt only. | |
| Give maximum physical guidance to choose and do operation. | Give minimum physical guidance to choose the right operation. | | | |
| | Over 3 trials gradually reduce length of time hand touches. | | | |

TEACHING SESSION GRAPH

Teacher(s) ______ Student ______



Comments:

Operations with 1 distractor

* teacher probes

# EARLY EDUCATION PROJECT

## Program Sheet

## Developmental Area: Cognition

Behavior Target

Receptive language concepts and operations: will select the appropriate materials from 4 known objects and complete the specified operation within 5 seconds of an instruction.

Steps

1) Will select the appropriate materials from 2 known objects and complete the specified operation.
2) Will select the appropriate materials from 3 known objects and complete the specified operation.
3) Same as the Behavior Target

Setting

Sitting in a place with few distractions; will have the objects used in front of

Materials

The appropriate objects for the instructions being given to the child (eg. "Put the baby in the car").

Procedure

A) You will be working on two different combinations of materials involving one or two operations at the same time.
   a)
   b)

B) These combinations will be asked for randomly throughout the session (use random order recording sheet).

C) Vary the materials you are using from session to session, eg. different cups, spoons, etc.

D) Vary the position of the materials in relation to each other from trial to trial.

Place materials in front of child and give instructions that specifies the materials and what operation should be completed.

1) Give maximum physical guidance. Use your hand on child's to guide through the activity you have requested.

2) Give minimal physical guidance. Use 1 finger behind wrist to guide through the activity you have requested.

3) Give child a physical prompt. You can model what you want done or indicate by pointing which objects should be used how.

4) Give a verbal prompt. Repeat the instruction very clearly and slowly.

5) Give an instruction that specifies the materials and what operation should be completed.

NOTE: For further instructions please refer to Standard Procedures for Teaching Programs.

Review

Once criterion is reached (3 trials in a row at a 5 level) put that item on review for one week. Present the materials for that instruction plus two other concept objects and give instruction at a 5 level. If child responds correctly within 5 seconds score as a 5. If doesn't score as a 0.

Prove

Once each day you will probe 2 other concept/operation combinations in the same situation. Materials will be presented and instruction given at a 5 level. If child correctly responds score as a 5. If incorrect score as a 0.

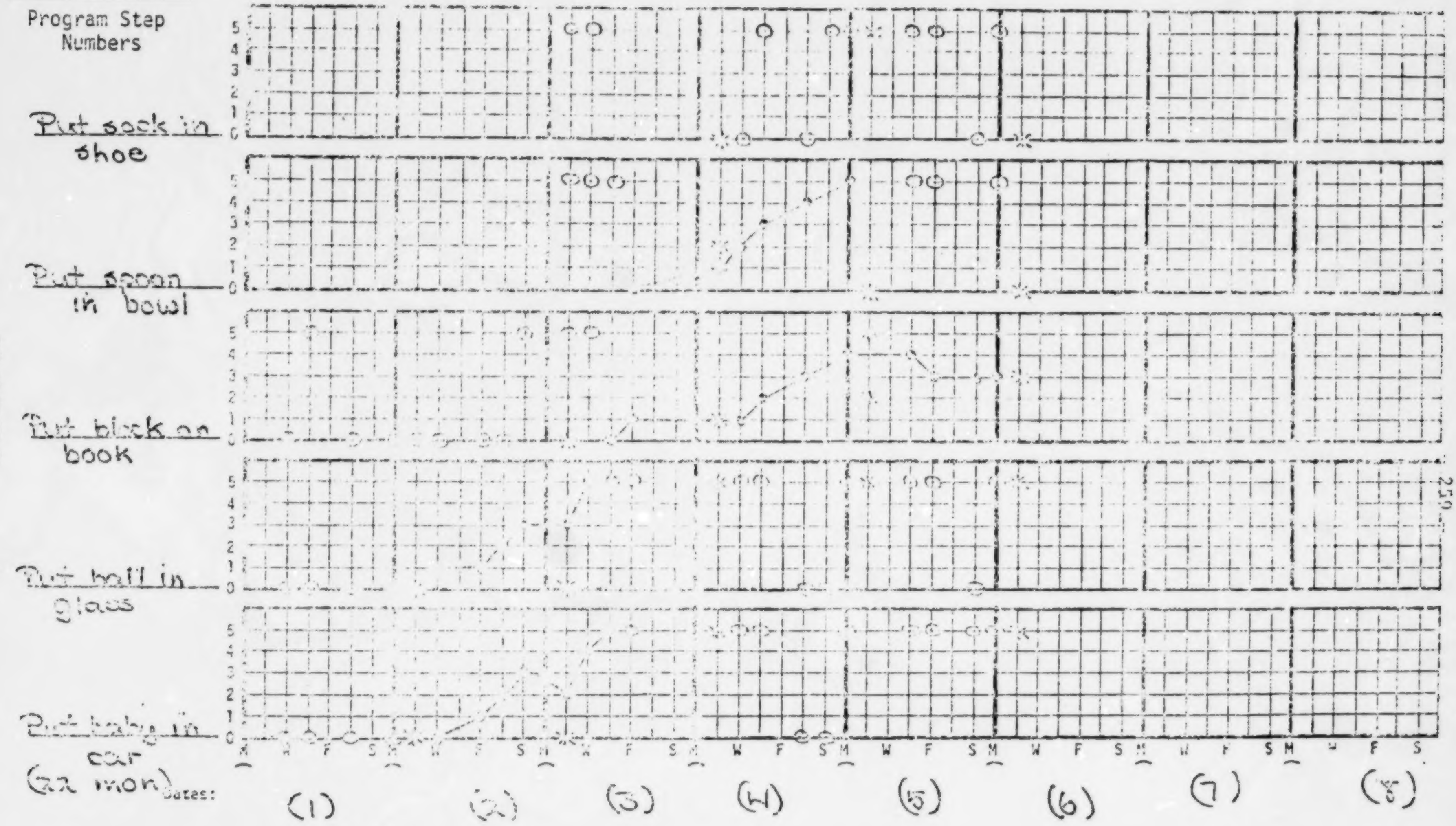
Maintenance

Once criterion is reached move to Incidental Teaching Program.

| LEVEL 1 | LEVEL 2 | LEVEL 3 | LEVEL 4 | LEVEL 5 |
|---|---|---|---|---|
| Get attention | Same Level 1 | Same Level 1 | Same Level 1 | Same Level 1 |
| Place materials and give the instruction | " | " | " | " |
| Repeat instruction and give physical prompt together | " | " | Repeat the instruction as a verbal prompt. | |
| Give maximum physical guidance to choose material and do operation | give minimum physical guidance to choose materials and do operation (1 finger) | | | |
| | | | | |

TEACHING SESSION GRAPH

Teacher(s) ______ Student ______



Comments:

language concepts [illegible] of action

* teacher probe

# EARLY EDUCATION PROJECT

## Program Sheet

## Developmental Area: Motor

### Behavior Target

Sitting supported: will sit on floor with back against wall or in a chair with backrest for 30 seconds if he is told to "look here" and is looking at a toy or person in front of him after being placed in this position.

### Steps

1) Hold position for 15 seconds
2) Hold position for 30 seconds

### Setting

Position yourself in front of child whether on floor or in chair.

### Materials

Any interesting toys or objects.

### Procedure

Place in an appropriate position and say "Look here".

1) Give maximum guidance as low on trunk as possible to maintain the appropriate posture.

   N.B. Immediately before the trial, apply a quick forceful stretch over shoulders to the floor.

2) Give minimum guidance as low on trunk as possible to maintain the appropriate posture.

N.B. Immediately before the trial apply the same stretch as in (1) above.

3) Provide gestures to to maintain the appropriate posture.

N.B. Apply resistance downward on shoulders during the entire trial. It is applied in same position and direction as stretch. Apply smoothly so child puts in some effort but do not push him out of position. Fade it out during the series of trials.

4) Provide verbal prompts to to maintain his position eg. word games, counting, etc.

5) Place in position appropriate and say "Look here".

NOTE: See "Standard Procedures for Teaching Programs" for further instructions.

Review Trials

Once completes 3 consecutive trials at a level 5 the program goes on review. Try once a day for 5 days at a 5 level. If he/she completes give a 5. If falls forward or to sides give a 0.

Maintenance

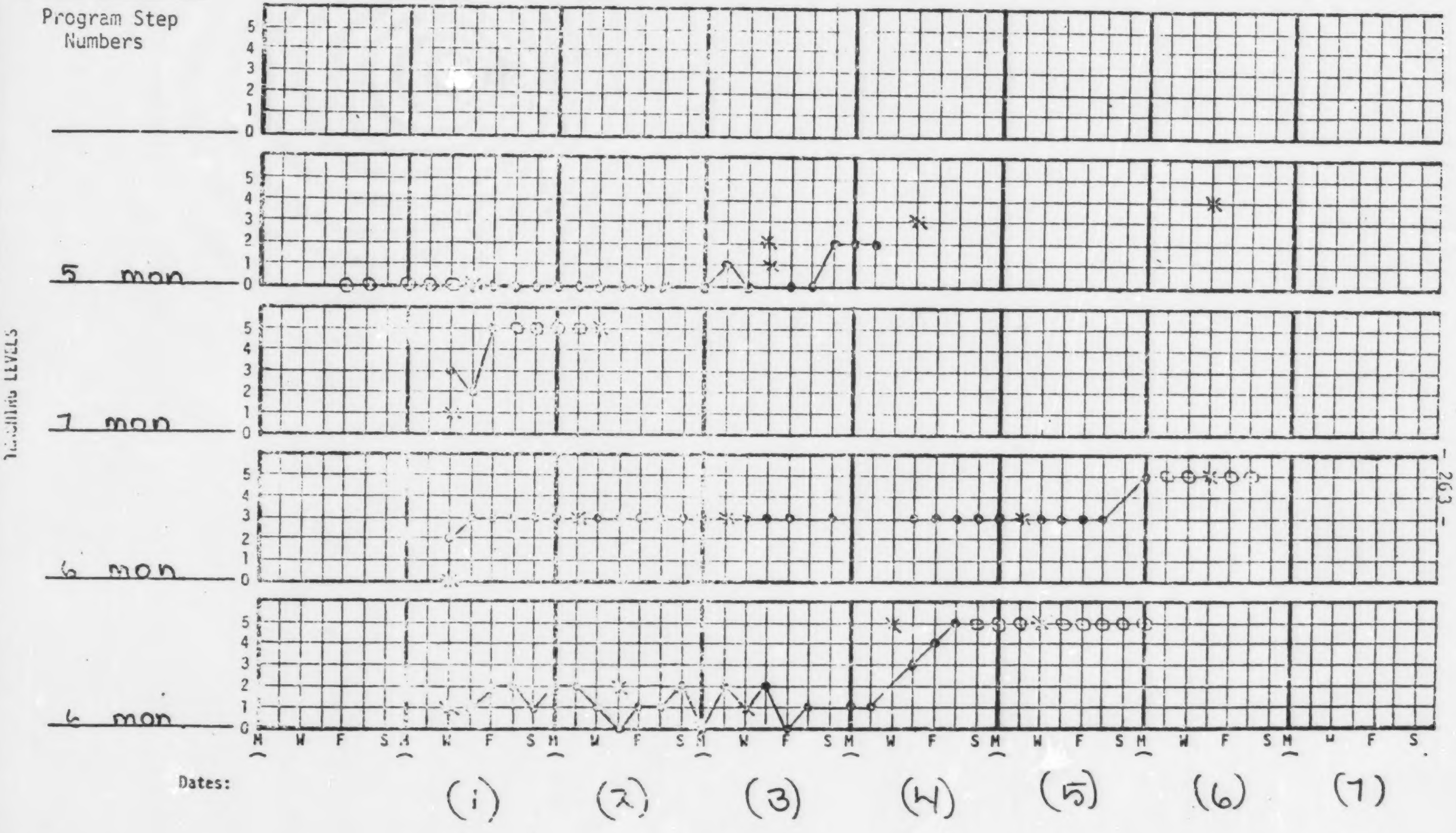
Once criterion is reached move to the Incidental Teaching Program. Start teaching next program in the series.

| LEVEL 1 | LEVEL 2 | LEVEL 3 | LEVEL 4 | LEVEL 5 |
|---|---|---|---|---|
| Place in | Same Level 1 | Same Level 1 | Same Level 1 | Same Level 1 |
| appropriate position in chair or against wall and say "Look here" | | | | |
| Give verbal prompts and maximum physical guidance to maintain position for required time. | Give verbal prompts and minimum physical guidance to maintain position for required time. | Give verbal prompts and gestures to maintain position for required time. | Give verbal prompts only to maintain position for required time. | |
| STRETCH<br>before trial | STRETCH<br>before trail | RESISTANCE<br>during trial | | |
| | | | | |

TEACHING SESSION

GRAPH

Teacher(s) ______ Student ______



Comments:

sit with back support (sit- Posture #2 - step 2)

* teacher probes

# EARLY EDUCATION PROJECT

## Program Sheet

## Developmental Area: Motor

### Behavior Target

Creeping on stomach: will creep forward designated distance in a reciprocal pattern on stomach when given instruction "Come here", and offered an interesting object.

### Setting

On the floor with

### Steps

1) will crawl forward 2 feet
2) will crawl forward 5 feet
3) will crawl forward 10 feet

### Materials

Any interesting toys or objects may be used.

### Procedure

Place on floor on stomach and given the instruction "Come here".

1) Give maximal guidance to achieve the desired movement. You will move one arm forward then push opposite leg forward (pressure downward and forward against bottom of the foot) then other arm and last foot.
2) Give minimal (one finger guidance) to achieve desired movement (i.e. move arms and legs in reciprocal pattern as (1) above with 1 finger).

3) Gesture to to achieve the desired movement (eg. point at toy, move it to attract attention). During the pushing motion phase of each leg apply slight pressure against bottom of foot with 1 finger. He/she will push against this in moving forward.
4) Give verbal prompts to achieve the desired motion (eg. "Come to mon, keep going", etc).
5) When placed on floor and given instruction "come here" he/she does. Also if you observe creeping spontaneously.

NOTE: Refer to "Standard Procedures for Teaching Programs" for further instructions.

Review Trials

Once completes 3 consecutive trials at a level 5 the program goes on review. Do once a day for 5 days at a 5 level. If he/she creeps the distance required give a 5. If doesn't creep give a 0.

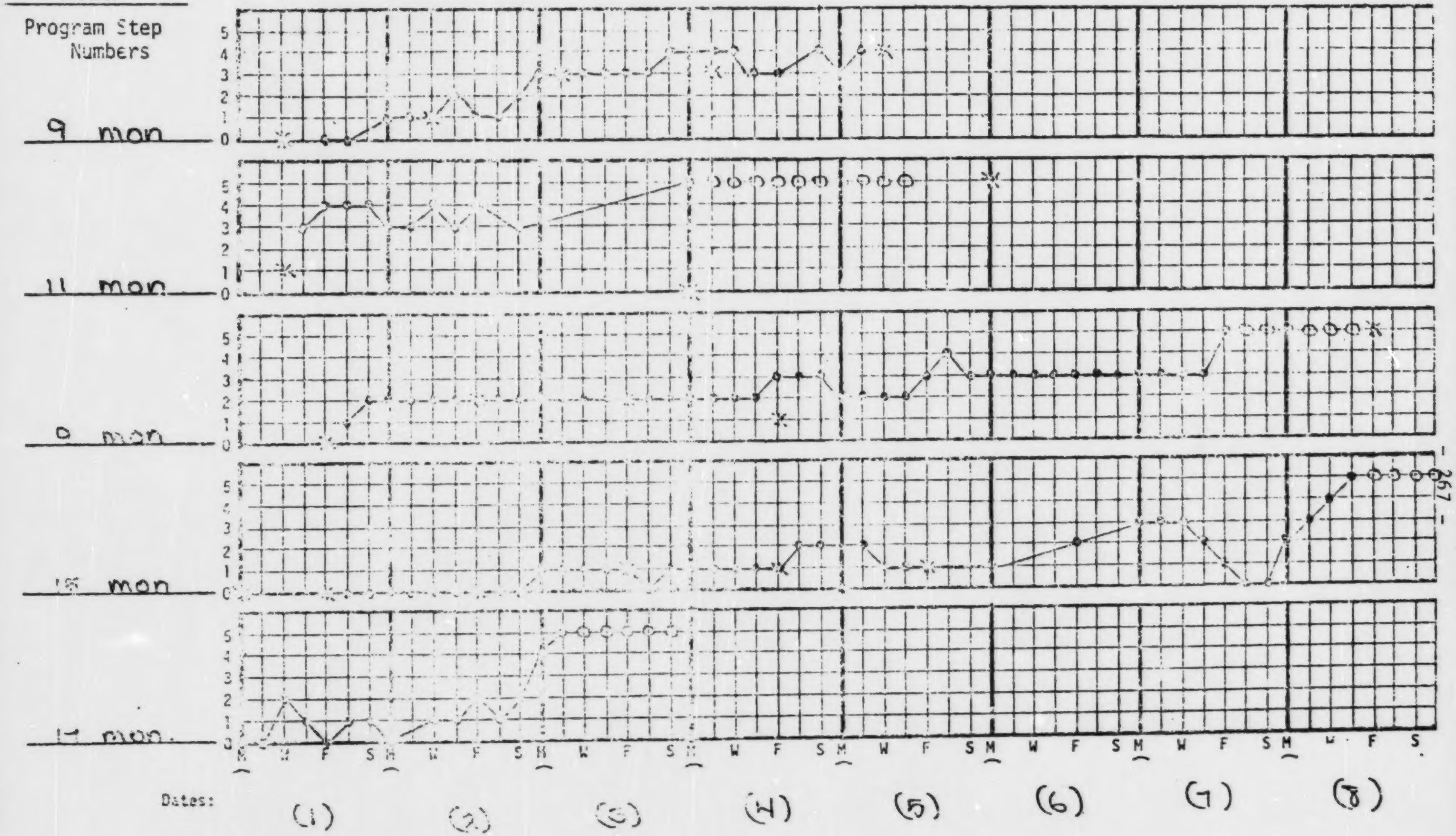
Maintenance

Once criterion is reached move to the Incidental Teaching Program. Wherever feasible give him/her opportunity to creep rather than being carried.

| LEVEL 1 | LEVEL 2 | LEVEL 3 | LEVEL 4 | LEVEL 5 |
|---|---|---|---|---|
| | | | | |
| Place on stomach and give instruction "Come here" | Same Level 1 | Same Level 1 | Same Level 1 | Same Level 1 |
| Give verbal prompts and maximum guidance to get to creep | Give verbal prompts and minimum guidance to get to creep. | Give verbal prompts and gestures to get creeping movement | Give verbal prompts only to get creeping movement | |
| | | Give some pressure against feet. | | |
| May require 2 persons | May require 2 persons | | | |

TEACHING SESSION
GRAPH

Teacher(s) ______________________ Student ______________________



Comments:

Creeping on stomach (Crawl - Locomotion - Step 1)

* teacher probes

# EARLY EDUCATION PROJECT

## Program Sheet

Developmental Area: Self Help

### Behavior Target

Drink from glass unassisted: will pick up cup with both hands, raise to mouth, drink and return it to table unassisted following the instruction, "You drink".

### Steps.

1) Return glass to table after drinking (with assistance to drink).
2) Will tilt glass to drink once it is at mouth.
3) Will lift glass from table to mouth once hands are placed on it.
4) Will grasp glass with both hands and lift to mouth.

### Setting

Have sitting in place where he/she regularly drinks. Position yourself facing ________________.

### Materials.

1) unbreakable cup
2) bib
3) juice, milk or water (1/2" in bottom).

### Procedure.

1) once each step is learned at a 5 level child must continue to do it independently even though you may be teaching next step at a lower level (eg. always put own glass down after Step 1 taught).

2) Give child maximum guidance to reach the step in the program that is being taught.

Teaching Instructions

Give maximum guidance to reach the step in the program that is being taught.

1) Give maximum guidance to complete the step in the program that you are teaching
   (eg. Step 1 - put through drinking and putting glass down.
   Step 2 - put through grasping and lifting glass (tilt and put down by self)).
2) Give minimum (1 finger) guidance to complete the step that is being taught
   (eg. Step 3 - put hands on glass
   - one finger on each hand to help raise to mouth
   - drink and put down by self).
3) Give a physical prompt to indicate what they should do
   (eg. Step 1 - put through drinking
   - point at table to indicate where you want glass to go).
4) Give a verbal prompt to indicate what should be done
   (eg. Step 2 - say "Tip it up").
5) Give child an instruction "You drink".

NOTE: Please refer to "Standard Procedures for Teaching Programs" for further information.

Review

Once has reached 3 consecutive trials at a 5 level for Step 4 the program is on review. Do once a day at level 5 for 5 days. Socre 5 if drinks completely unassisted within 5 seconds of instruction "You drink", and 0 if doesn't.

Maintenance

Once the task is learned it is moved to the Incidental Teaching Format. Always require to drink independently. Following this do not provide assistance.

| LEVEL 1 | LEVEL 2 | LEVEL 3 | LEVEL 4 | LEVEL 5 |
|---|---|---|---|---|
| Put through to step being taught | Same Level 1 | Same Level 1 | Same Level 1 | Same Level 1 |
| Give instruction<br>a) you drink<br>b) put glass down | | | | |
| Provide verbal and physical prompt appropriate for step together | | | Give verbal prompt appropriate to step only | |
| Give maximum guidance to complete the step. | Give minimum guidance (1 finger) to complete the step | | | |
| Once a step learned always make child do it independently. | | | | |

GRAPH

Teacher(s) ______________________ Student ______________________

Program Step Numbers

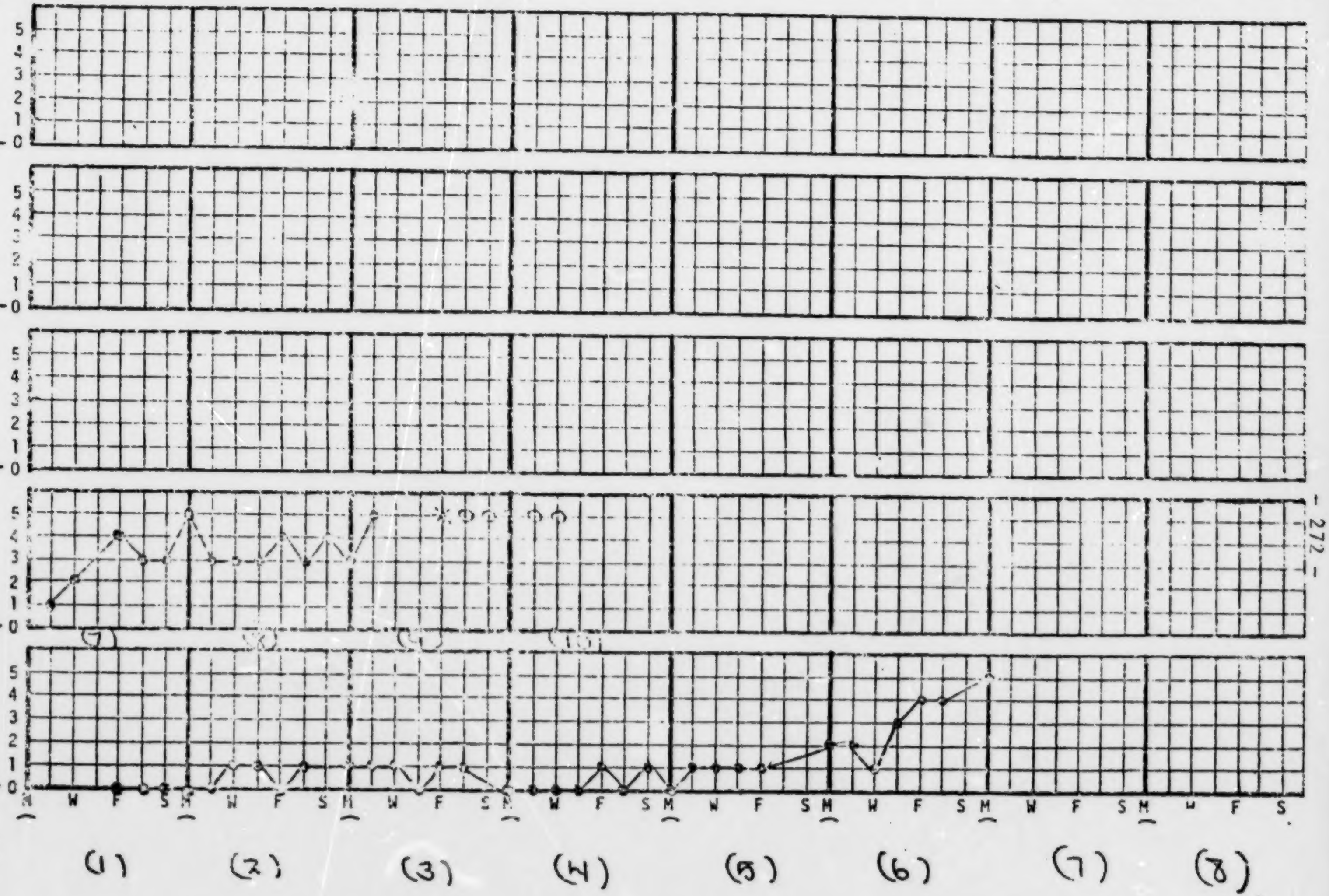
TEACHING LEVELS

Step 3

Step 2

20 mon

Dates:



Comments:

Drink from cup independently

# EARLY EDUCATION PROJECT

## Program Sheet

## Developmental Area: Self Help

### Behavior Target

Eating with spoon: will scoop food with spoon, raise to mouth, remove food and return spoon to plate independently.

### Steps

1) Return spoon to dish.
2) Move spoon from 1 inch from mouth, eat and return spoon to dish.
3) Move spoon from dish to mouth, eat and return spoon to dish.
4) Scoop food, carry to mouth, eat and return spoon to dish.

### Setting

At mealtimes when serving food it is appropriate to eat with a spoon.

### Materials

small spoon
bowl
food that child can scoop

### Procedure

1) Once each step is learned at a 5 level child must continue to do it independently even though you may be teaching next step at a lower level.
2) Always take hand in yours and put through the task to the step you are teaching. Then proceed with the teaching instructions.

Teaching Instructions

1) Guide through the step you are working on with you hand over child's.
2) Guide through the step you are working on with 1 finger (eg. 1 finger behind his/her wrist).
3) Give a physical prompt (gesture or model) appropriate to the step you are working on (eg. point at table to put spoon down, model bringing spoon to mouth).
4) Give a verbal prompt appropriate to the step you are working on (eg. "Put your spoon down").
5) Give instruction "Eat your food".

NOTE: Refer to "Standard Procedure for Teaching Programs" for further instructions.

Review

Once            is able to scoop food onto spoon and feed self completely at a 5 level for 3 consecutive trials put program on review. Check once a day at a 5 level for one week. If he/she feeds self independently score as a 5. If requires assistance with every spoonful score 0.

Maintenance

Once program has reached criterion put on Incidental Teaching Format. Always require            to feed himself/herself whenever possible.

| LEVEL 1 | LEVEL 2 | LEVEL 3 | LEVEL 4 | LEVEL 5 |
|---|---|---|---|---|
| | | | | |
| Say "Eat with spoon" | Same as Level 1 | Same as Level 1 | Same as Level 1 | Same as Level 1 |
| Give verbal and physical prompts together. | " | " | Give verbal prompts only | |
| Guide through step working on with hand. | Guide through step working on with 1 finger. | | | |
| | | | | |

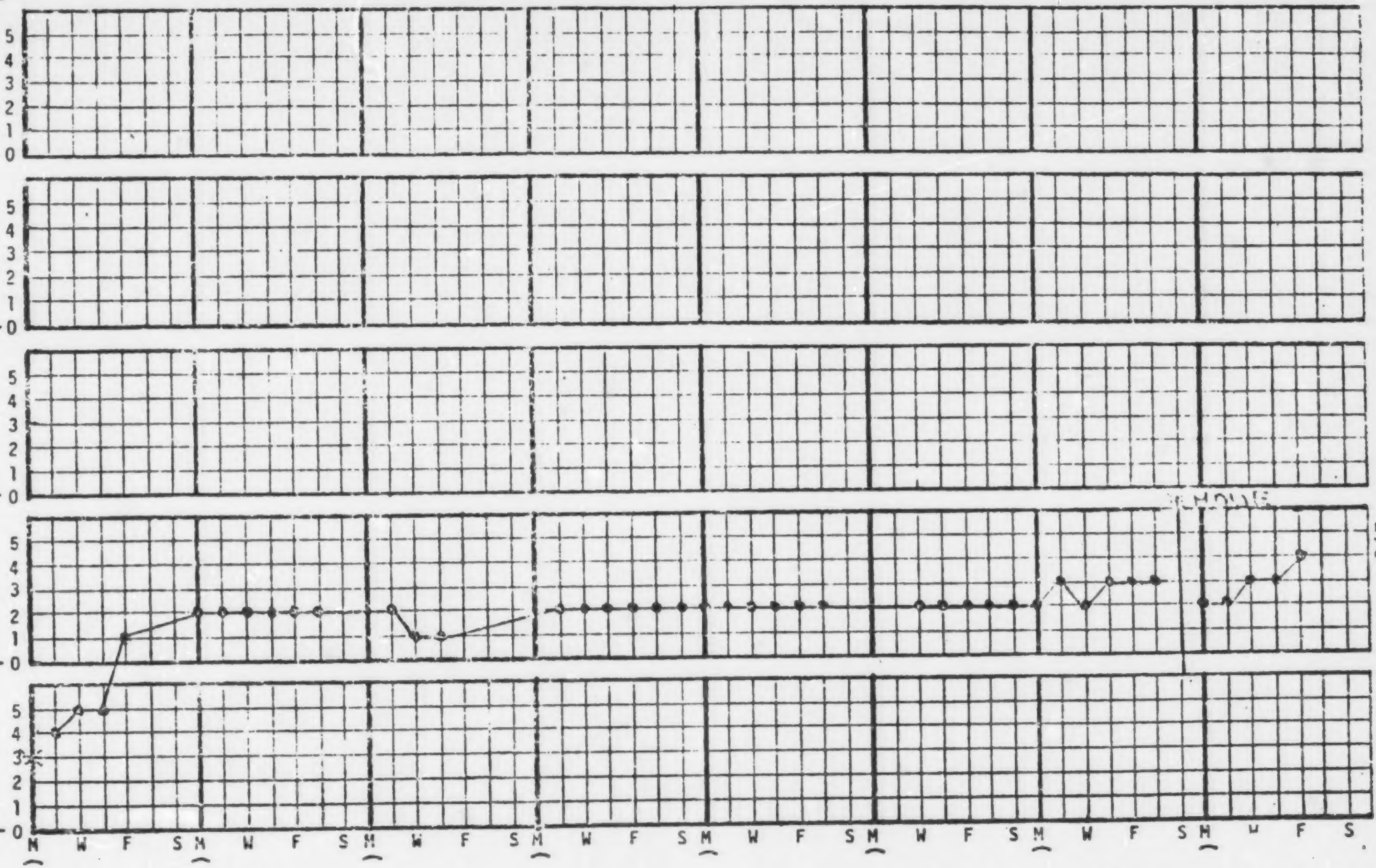
TEACHING SESSION
GRAPH

Teacher(s) ______ Student ______

Program Step Numbers

Step 3

Step 2
27 mon.



Dates: (1) (2) (3) (4) (5) (6) (7) (12)

ents:

Eat with spoon independently

# EARLY EDUCATION PROJECT

## Program Sheet

## Developmental Area: Self Help

Behavior Target

Puts on socks puts on socks (with heel in the correct position) within 5 seconds of the instruction "Put on socks".

Steps

1) Puts on sock when just above heel.
2) Puts on sock when just below heel.
3) Puts on sock when toes started in.
4) Puts on sock when handed to him with heel in correct position.
5) Puts on sock (heel in correct position)

Setting

Have sitting in a safe and comfortable position (eg. table, top, floor).

Procedure

1) Once each step is learned at a 5 level child must continue to do it independently even though you may be teaching next step at a lower level.
2) Put sock on child to point where you will be teaching from.

Teaching Instructions

Give maximum guidance to the step in the program that you are teaching.

1) Give maximum guidance to complete the step that is being taught

(eg. with you hands over pull sock over the heel).

2) Give minimum (1 finger) guidance to complete the step that is being taught (eg. with 1 finger on each hand guide to pull sock up from heel).

3) Give a physical prompt to indicate what they should do to complete the task (i.e. use a gesture or a model).

4) Give a verbal prompt to indicate what should be done (eg. pull your sock up).

5) Give an instruction (i.e. "Put on sock").

NOTE: Please refer to "Standard Procedures for Teaching Programs" for further information.

Review

Once has put sock on completely at a 5 level for 3 times in a row put it on review. Do once a day at a 5 level for one week. If he/she does it without assistance score as a _5_. If requires assistance score as a _0_.

Probes

Once each day while you are teaching this program you will probe two other dressing or undressing tasks. Give an instruction. If he/she completes the task independently score as a _5_. If requires assistance to complete score as a _0_.

Maintenance

Once program has reached criterion put on Incidental Teaching Format. Always require to put on his/her own socks.

| LEVEL 1 | LEVEL 2 | LEVEL 3 | LEVEL 4 | LEVEL 5 |
|---|---|---|---|---|
| Put sock on to step being taught. | Same Level 1 | Same Level 1 | Same Level 1 | Same Level 1 |
| Give verbal instruction ("Put on sock") | | | | |
| Give verbal and physical prompt together. | | | Give verbal prompt only to complete the step. | |
| Give maximum physical guidance to complete the step. | Give minimum physical guidance (1 finger) to complete the step. | | | |
| | | | | |

TEACHING SESSION

GRAPH

Teacher(s) ______ Student ______

Program Step Numbers

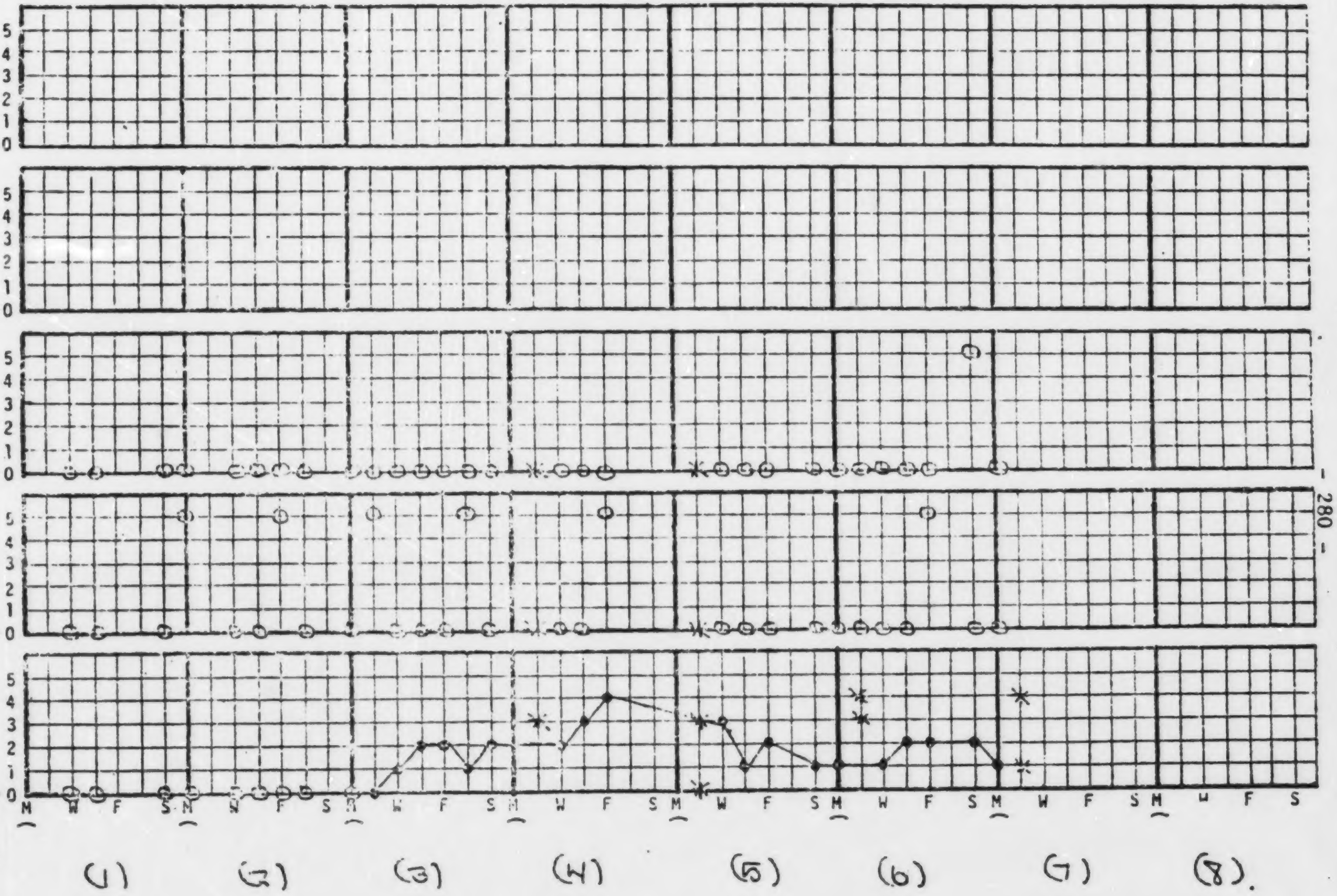
shirt on

shirt off

sock on

teach step i)

22 mon. Dates:



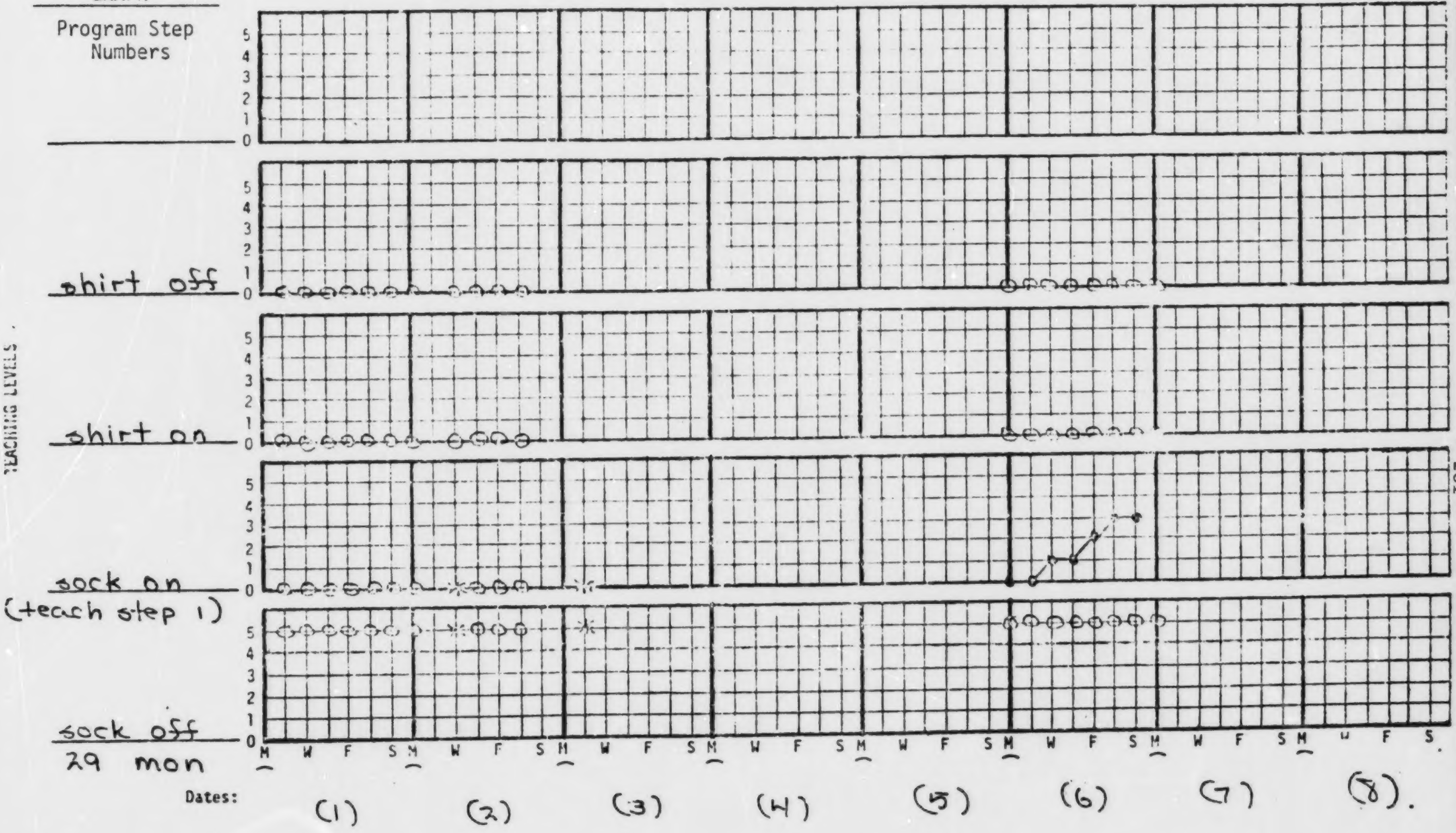
ents:

* teacher probe.

TEACHING SESSION

GRAPH

Teacher(s) ____________________ Student ____________________

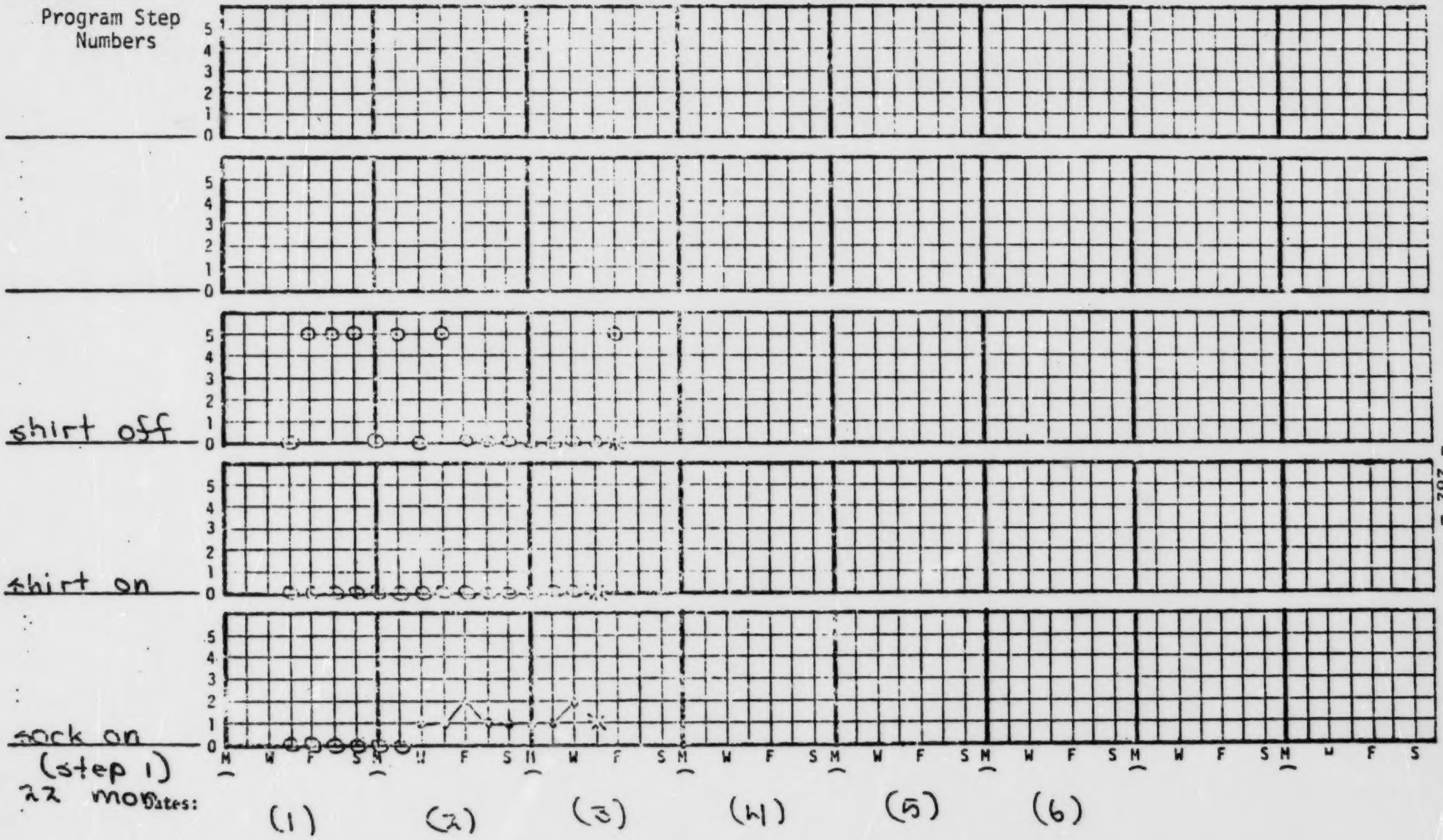


omments:

* teacher probe

TEACHING SESSION
GRAPH

Teacher(s) ______________________ Student ______________________



ents:

* teacher probe

# APPENDIX C

# SCHOOL PROGRAMS FOR LANGUAGE, COGNITION, AND SELF-HELP SKILLS

# APPENDIX C

## EARLY EDUCATION PROJECT

## Program Sheet

Developmental Area: Language

Behavior Target:

Actions and sounds: will imitate your model within 5 seconds for an action and 2 sounds.

Setting:

With facing you in a place with few distractions (e.g. T.V. persons).

Materials:

Whatever is indicated with the action.

Procedure:

(a) Precede the trials up to a level 4 with the attend signal. At levels 4 and 5 use only a verbal instruction (e.g. 'Look,...') and no signal.

(b) You will be working on one action and one sound at the same time.

(c) The two responses will be presented randomly throughout the session. (Use random order recording sheet.)

| Action | Sound |
|---|---|
| Get action (use signal as described in (a) above. Give instruction with a model of action. | Get attention (use) signal as described in (a) above. Give instruction "Say...." with appropriate sign. |
| (1) Physically guide with your hand to imitate the action. | (1) No maximum physical guidance. |
| (2) Physically guide with 1 finger to imitate the action. | (2) No minimum physical guidance. |
| (3) Give physical prompt or gesture to indicate what action you want | (3) Give physical prompt to indicate you want a sound (e.g. point at your mouth and then his). |
| (4) Give an additional verbal prompt (e.g. you roll the ball). Describe the action. | (4) Give additional verbal prompt (repeat sound). |
| (5) Give instruction "you do it" with the model | (5) Give instruction with appropriate sign accompanying ("say...."). |

NOTE: Refer to Standard Procedures for Teaching Programs for further information.

Probe Trials:

Once each day probe two untrained words. If repeats the word within 5 seconds score as a 5. If says the wrong thing, is unintelligable or says nothing score as a 0.

Review:

Once has reached 3 consecutive trials at a 5 level for either an action or sound place on review. Do once a day at a 5 level for 5 days - wait 5 seconds. Score as a 5 if imitates the action or sound and a 0 if doesn't. Replace item in program with another action or sound to be taught.

Maintenance:

Once criterion is reached move that sound or action to Incidental Teaching Format. Once two sounds have reached criterion move on to next program.

Receptive Language:

If is given an activity reinforcer or object, request it from him/her saying "Give me______", with accompanying gesture or hand prompt. If does not respond, repeat the instruction and physically guide him through the motion of giving. This receptive procedure is not recorded.

Reinforcement:

If imitates the sound you ask always repeat that sound in your verbal praise (e.g. Good talking, You said oh).

| LEVEL 1 | LEVEL 2 | LEVEL 3 | LEVEL 4 | LEVEL 5 |
|---|---|---|---|---|
| Get attention (use signal) | Same as Level 1 | Same as Level 1 | (No signal) | Same as Level 4 |
| Give instruction and model together | " | " | Same as Level 1 | Same as Level 1 |
| Give additional verbal prompt and physical prompt together | " | " | Give additional verbal prompt only | |
| Physically guide with hand to imitate the response | Physically guide with 1 finger to imitate the response. | | | |
| | | | | |

## EARLY EDUCATION PROJECT

### Program Sheet

Developmental Area: Language

Behavior Target

Sounds and words: will imitate your model within 5 seconds for sounds and 2 words.

Setting:

With facing you in a place with few distractions. Have the two of you at the same eye level.

Materials:

Objects for the words that are being taught.

Procedure:

(a) Precede trials up to a Level 4 with the attend signal. At levels 4 and 5 use only a verbal instruction (i.e. 'Look,_________') and no signal.

(b) You will be working on one sound and one word at the same time.

(c) The two responses will be presented randomly throughout the session. (Use random order recording sheet).

| Sound | Word |
|---|---|
| Get attention (use signal as described above). Give instruction "say,...." with appropriate sign | Get attention (use signal as described in (a) above). Give instruction and hold up object |
| (1) No maximum physical guidance | (1) No maximum physical guidance |
| (2) No minimum physical guidance | (2) No minimum physical guidance |
| (3) Give physical prompt to indicate you want a sound (e.g. point at your mouth and then his). | (3) Give a physical prompt to indicate you want word repeated (point at object and then mouth). |
| (4) Give additional verbal prompt (repeat sound). | (4) Give additional verbal prompt (repeat word). |
| (5) Give instruction with appropriate sign accompanying ("say....") | (5) Hold up object and give instruction "Say...." |

NOTE: Refer to Stnadard Procedures for Teaching Programs for further information.

Probe Trials:

Once each day probe two untrained words. If repeats the word within 5 seconds score as a 5. If says the wrong thing is unintelligable or says nothing score as a 0.

Review:

Once has reached 3 consecutive trails at a 5 level for either a sound or a word place on review. Do once a day at a 5 level for 5 days. Score as a 5 if imitates the sound or word within 5 seconds. Score as a 0, if says wrong thing, is unintelligable or says nothing. Replace item in program with another sound or word to be taught.

Maintenance:

Once criterion is reached move that sound or word to Incidental Teaching Format. Once two words have reached criterion move on the next program.

Receptive Language:

If is given an activity reinforcer or object, request it from the child saying 'Give me...', with accompanying gesture or hand prompt, pointing to object and then your hand. If does not respond, repeat the instruction and physically guide through the motion of giving. This receptive procedure is not recorded.

Reinforcement:

If imitates the word you ask, give him the object and let him play with it for a moment or play with him with the object. Always repeat the word or sound in your verbal praise. (e.g. that's right, you said ball).

| LEVEL 1 | LEVEL 2 | LEVEL 3 | LEVEL 4 | LEVEL 5 |
|---|---|---|---|---|
| | | Get attention | Get attention | Get attention |
| | | Give instruction and present the appropriate object | Same Level 3 | Same Level 3 |
| | | Give verbal and physical prompt together (e.g. point at object and repeat word) | Give verbal prompt only (e.g. repeat word). | |
| | | | | |
| | | | | |

## COGNITION OPERATION

Behavior Target: S will respond appropriately to the commands "put in", "put on", "take out", "take off", "push", "pull", "open", "close", regardless of the specific objects used within 5 seconds of the command.

Baseline: E will give S each of the above command on 5 separate occasions varying the specific materials listed under the "materials" section. If S responds appropriately on 4/5 trials go to next program. If S does not, see program below.

Steps: S will perform an operation within 5 seconds of instruction.

Procedure: Give attending signal before all trials. Place objects in front of S and give appropriate command, specific materials used are randomly alternated. Socially reinforce all correct responses with direct feedback. After three consecutive correct responses move to the next level of prompting. If S makes no response (NR) or an incorrect response return to the previous level and reach criteria at that level before moving up.

Level 1 - Complete physical guidance, use of an appropriate gesture and verbal prompt. Score 1.

Level 2 - One finger guidance, use of an appropriate gesture and verbal prompt. Score 2.

Level 3 - Gesture and appropriate verbal prompt. Score 3.

Level 4 - Appropriate verbal prompt. Score 4. (There may be more depending on the program).

Level 5 - On command. Score 5.

Gradually fade the level of guidance or prompting over the three trials at each level.

If S responds correctly on command before prompts can be given, score with a circle around the level he/she should be working on. After five consecutive circled numbers put on Review. If the child completes the terminal behavior on command, score with a star (*). After three stars put behavior on Review.

Review: Review behavior once daily for five days. If S responds correctly to 80% of the trials put on Maintenance. If S does not, return to program at a Level 5.

Maintenance: Review once weekly for five weeks. If S responds correctly to 80% of the trials discontinue the program. If S does not, return to Review.

Probes: Present trial for the next program in the strand.

Materials: Cup, blocks, peg, pegboard, sracking rings, penny bank, ten pokerchips, hat, box with lid etc.

# OPERATIONS WITH DISTRACTORS

Behavior Target: S will respond appropriately to the commands "put in", "put on", "take out", "take off", "push", "pull", "open", "close", regardless of specific objects used with 1 distractor present within 5 seconds of the command.

Baseline: E will give each of the above commands with 1 distractor present on 5 separate occasions varying the specific materials listed under the "Materials" section. If S responds appropriately on 4/5 trials go to next program. If S does not, see program below.

Steps: Operations will be taught in pairs. Select 2 operations that the child did not reach criterion on during baseline and randomly alternate as on the data sheet. When 1 operation is learned replace with another that has not yet reached criterion.

Procedure: Give attending signal before all trials. Place objects in front of S and give appropriate command. Distractors and specific materials used are varied. Socially reinforce all correct responses with direct feedback. After three consecutive correct responses move to the next level of prompting. If S makes no response (NR) or an incorrect response return to the previous level and reach criteria at that level before moving up.

Level 1 - complete physical guidance, use of an appropriate gesture and verbal prompt. Score 1.

Level 2 - One finger guidance, use of an appropriate gesture and verbal prompt. Score 2.

Level 3 - Gesture and appropriate verbal prompt. Score 3.

Level 4 - Appropriate verbal prompt. Score 4. (There may be more depending on the program).

Level 5 - On command. Score 5.

Gradually fade the level of guidance or prompting over the three trials at each level.

If S responds correctly on command before prompts can be given, score with a circle around the level he/she should be working on. After five consecutive circled numbers put on Review. If the child completes the terminal behavior on command, score with a star (*). After three stars put behavior on Review.

Review: Review behavior once daily for five days. If S responds correctly to 80% of the trials put on Maintenance. If S does not, return to program at a Level 5.

Maintenance: Review once weekly for five weeks. If S responds correctly to 80% of the trials discontinue the program. If S does not, return to Review.

Probes: Present trial for the next program in the strand

Materials: Cup, blocks, peg, pegboard, stacking rings, penny bank, tin pockerchips, hat, box with lid.

## STRINGING LACING HOLES

Behavior Target: On 3 consecutive trials when sitting at the table S will push a shoelace with stiffened end through a 1/4" diameter hole in a 1" square of cardboard held in S's hand and pull string through from the back on the command "Lace the card". Response must be initiated within 5 seconds and completed within 15 seconds of command.

Baseline: Give S a 1" square of cardboard with 1/4" hole in non-dominant hand and shoe lace in the other hand, give command "Lace the card", if S responds appropriately on 4/5 trials go to next program. If S does not, see program below.

Steps: (1) S will push shoelace through a 1-1/2" hole
(2) S will push shoelace through a 3/4" hole
(3) S will push shoelace through a 1/4" hole

Procedure: Give attending signal before all trials. S sits in group of 3-4 children at the table. Place appropriate lacing materials in front of S and give the command "Lace the card". Socially reinforce all correct responses with direct feedback. After three consecutive correct responses move to the next level of prompting. If S makes no response (NR) or an incorrect response return to the previous level and reach criteria at that level before moving up.

Level 1 - Complete physical guidance, use of an appropriate gesture and verbal prompt. Score 1.

Level 2 - One finger guidance, use of an appropriate gesture and verbal prompt. Score 2.

Level 3 - Gesture and appropriate verbal prompt. Score 3.

Level 4 - Appropriate verbal prompt. Score 4. (There may be more depending on the program).

Level 5 - On command. Score 5.

Gradually fade the level of guidance or prompting over the three trials at each level.

If S responds correctly on command before prompts can be given, score with a circle around the level he/she should be working on. After five consecutive circled numbers put on Review. If the child completes the terminal behavior on command, score with a star (*). After three stars put behavior on Review.

Review: Review behavior once daily for five days. If S responds correctly to 80% of the trials put on Maintenance. If S does not, return to program at a Level 5.

Maintenance: Review once weekly for five weeks. If S responds correctly to 80% of the trials discontinue the program. If S does not, return to Review.

Probes: Present trial for the next program in the strand

Materials: 3, 1" squares of cardboard with 1-1/2" hole, 3/4" hole and 1/4" hole. Shoelace with stiffened end.

## 6 PIECE PUZZLE

Non-interlocking

Behavior Target: S will complete a 6 piece (non-interlocking) wooden puzzle by putting the pieces in random order within 5 seconds of command "Put in".

Baseline: S sits at table or on rug with group. Give attending signal and shows the complete puzzle and then dumps the pieces out. Arrange pieces randomly in front of S with puzzle board. Give command "Put in". If S completes the puzzle within 30 seconds of command on 4/5 trials, proceed to next program. If not refer to program below.

Steps: (1) S will put last piece in puzzle
(randomize last piece over trials)
(2) S will put in 5th and 6th piece of puzzle (randomize)
(3) S will put in 4th, 5th, 6th piece of puzzle (randomize)
(4) S will put in 3rd, 4th, 5th, 6th piece of puzzle (randomize)
(5) S will put in 2nd, 3rd, 4th, 5th, 6th piece of puzzle (randomize)
(6) S will put in all 6 pieces of puzzle (randomize)

Steps may be skipped or grouped.

Procedure: S sits at table with group. Give appropriate attending signal for the level the child is working at and set puzzle and pieces in front of S. If S does not attend within 5 seconds move on to another child. If S attends within 5 seconds give the command "Put in". Socially reinforce all correct responses with direct feedback. After three consecutive correct responses move to the next level of prompting. If S makes no response (NR) or an incorrect response return to the previous level and reach criteria at that level before moving up.

Level 1 - Complete physical guidance, use of an appropriate gesture and verbal prompt. Score 1.

Level 2 - One finger guidance, use of an appropriate gesture and verbal prompt. Score 2.

Level 3 - Gesture and appropriate verbal prompt. Score 3.

Level 4 - Appropriate verbal prompt. Score 4.
(There may be more depending on the program).

Level 5 - On command. Score 5.

Gradually fade the level of guidance or prompting over the three trials at each level.

If S responds correctly on command before prompts can be given, score with a circle around the level he/she should be working on. After five consecutive circled numbers put on Review. If the child completes the terminal behavior on command, score with a star (*). After three stars put behavior on Review.

Review: Review behavior once daily for five days. If S responds correctly to 80% of the trials put on Maintenance. If S does not, return to program at a Level 5.

Maintenance: Once a week for 5 weeks give S the command "Put in" and record. Socially reinforce if S responds correctly.

Probes: If S is working on a step 1 thru 5 of the program, once a week probe for T.B. If S is working on step 6, probe next program.

Materials: Variety of wooden puzzles with 6 pieces not interlocking e.g. Fisher-Price

## PUTS TOGETHER INTERLOCKING PUZZLE

Behavior Target: On 3 consecutive trials when sitting at the table S will complete a 6 piece interlocking wooden puzzle by putting the pieces in, in random order within 1-1/2 minutes of the command "Put the pieces in the puzzle".

Baseline: S sits at table with group show S the completed puzzle. Dump pieces out and arrange randomly in front of S with the puzzle board. Give the command "Put the pieces in the puzzle". If S completes the puzzle within 1-1/2 minutes of the command on 4/5 trials proceed to next program, if not refer to program below. Count and record how many pieces are put in.

Steps: (1) S will put last piece in puzzle (randomize last piece over trials)
(2) S will put in 5th, 6th pieces of puzzle (randomize)
(3) S will put in 4th, 5th and 6th pieces (randomize)
(4) S will put in 3rd, 4th, 5th and 6th pieces (randomize)
(5) S will put in 2nd, 3rd, 4th, 5th, and 6th pieces (randomize)
(6) S will put in all 6 pieces of puzzle

Procedure: Give attending signal before all trials. S sits at table with group. Give child puzzle and pieces in front of S. Give the command, "Put the pieces in the puzzle". Socially reinforce all correct responses with direct feedback. After three consecutive correct responses move to the next level of prompting. If S makes no response (NR) or an incorrect response return to the previous level and reach criteria at that level before moving up.

Level 1 - Complete physical guidance, use of an appropriate gesture and verbal prompt. Score 1.

Level 2 - One finger guidance, use of an appropriate gesture and verbal prompt. Score 2.

Level 3 - Gesture and appropriate verbal prompt. Score 3.

Level 4 - Appropriate verbal prompt. Score 4.
(There may be more depending on the program).

Level 5 - On command. Score 5.

Gradually fade the level of guidance or prompting over the three trials at each level.

If S responds correctly on command before prompts can be given, score with a circle around the level he/she should be working on. After five consecutive circled numbers put on Review. If the child completes the terminal behavior on command, score with a star (*). After three stars put behavior on Review.

Review: Review behavior once daily for five days. If S responds correctly to 80% of the trials put on Maintenance. If S does not, return to program at a Level 5.

Maintenance: Review once weekly for five weeks. If S responds correctly to 80% of the trials discontinue the program. If S does not, return to Review.

Probes: If S is working on step 1-5 once a week probe for T.B. If S is working on step 6, probe next program.

Materials: Fisher Price Puzzle #515 (some pieces taped in)

## BODY PARTS PROGRAM

Behavior Target: On 3 consecutive trials when sitting at the table, on command "Show ________" S will point to each of the body parts below: nose, hair, tummy, mouth, knee, back, foot, chin, eye, thumb.

Baseline: Give the command "Show ________" for each of the above on 5 separate occasions, randomly alternating the trials, if S responds appropriately on 4/5 trials go to next program. If S does not, see program below.

Steps: Give command "Show ________" S will show appropriate body parts within 5 seconds of command.

Procedure: Randomly choose 2 of the above body parts and work with those. As an item reaches criterion place it on review and add another item from above. Give the command "Show ________", give verbal prompt e.g. "Show nose"- point to your nose. Give attending signal before all trials. Socially reinforce all correct responses with direct feedback. After three consecutive correct responses move to the next level of prompting. If S makes no response (NR) or an incorrect response return to the previous level and reach criteria at that level before moving up.

Level 1 - Complete physical guidance, use of an appropriate gesture and verbal prompt. Score 1.

Level 2 - One finger guidance, use of an appropriate gesture and verbal prompt. Score 2.

Level 3 - Gesture and appropriate verbal prompt. Score 3.

Level 4 - Appropriate verbal prompt. Score 4. (There may be more depending on the program).

Level 5 - On command. Score 5.

Gradually fade the level of guidance or prompting over the three trials at each level.

If S responds correctly on command before prompts can be given, score with a circle around the level he/she should be working on. After five consecutive circled numbers put on Review. If the child completes the terminal behavior on command, score with a star (*). After three stars put behavior on Review.

Review: Review behavior once daily for five days. If S responds correctly to 80% of the trials put on Maintenance. If S does not, return to program at a Level 5.

Maintenance: Review once weekly for five weeks. If S responds correctly to 80% of the trials discontinue the program. If S does not, return to Review.

Probes: Ear, elbow, finger.

Materials: None.

## SHOW NOSE PROGRAM

Behavior Target: On 3 consecutive trials when sitting at the table S will point to 4 body parts (nose, hair, eye, mouth) on a doll, flannelboard man, or picture within 5 seconds of command, "Show man's (doll's) ________".

Baseline: Give the command "Show man's _____" for each of the body parts on 5 separate occasions, randomly alternating the trials, if S responds appropriately on 4/5 trials go to next program. If S does not, see program below.

Steps: Give command "Show man's ________" S will show appropriate body part within 5 seconds of command.

Procedure: Start with first two body parts that need to be trained. As an item reaches criterion place it on review and add next item. Randomly alternate presentations of the 2 body parts. Socially reinforce all correct responses with direct feedback. After three consecutive correct responses move to the next level of prompting. If S makes no response (NR) or an incorrect response return to the previous level and reach criteria at that level before moving up.

Level 1 - Complete physical guidance, use of an appropriate gesture and verbal prompt. Score 1.

Level 2 - One finger guidance, use of an appropriate gesture and verbal prompt. Score 2.

Level 3 - Gesture and appropriate verbal prompt. Score 3.

Level 4 - Appropriate verbal prompt. Score 4.
(There may be more depending on the program).

Level 5 - On command. Score 5.

Gradually fade the level of guidance or prompting over the three trials at each level.

If S responds correctly on command before prompts can be given, score with a circle around the level he/she should be working on. After five consecutive circled numbers put on Review. If the child completes the terminal behavior on command, score with a star (*). After three stars put behavior on Review.

Review: Review behavior once daily for five days. If S responds correctly to 80% of the trials put on Maintenance. If S does not, return to program at a Level 5.

Maintenance: Review once weekly for five weeks. If S responds correctly to 80% of the trials discontinue the program. If S does not, return to Review.

Probes: Present trial for the next program in the strand.

Materials: doll, flannel board man, etc.

## SHOW NOSE PROGRAM

Behavior Target: On 3 consecutive trials when sitting at the table S will add 4 body parts (nose, hair, eye, mouth) to a blank flannelboard or picture face initiating within 5 seconds and finishing within 15 seconds of the command "Make the face".

Baseline: Test target behavior on 5 separate occasions.

Steps: (1) S adds 1 missing part randomly alternated on trials

(2) S adds 2 missing parts randomly alternated

(3) S adds 4 parts randomly alternated

Procedure: Give attending signal before all trials. Place flannelboard face in front of S with the appropriate number of missing parts below the face. Socially reinforce all correct responses with direct feedback. After three consecutive correct responses move to the next level of prompting. If S makes no response (NR) or an incorrect response return to the previous level and reach criteria at that level before moving up.

Level 1 - Complete physical guidance, use of an appropriate gesture and verbal prompt. Score 1.

Level 2 - One finger guidance, use of an appropriate gesture and verbal prompt. Score 2.

Level 3 - Gesture and appropriate verbal prompt. Score 3.

Level 4 - Appropriate verbal prompt. Score 4.
(There may be more depending on the program).

Level 5 - On command. Score 5.

Gradually fade the level of guidance or prompting over the three trials at each level.

If S responds correctly on command before prompts can be given, score with a circle around the level he/she should be working on. After five consecutive circled numbers put on Review. If the child completes the terminal behavior on command, score with a star (*). After three stars put behavior on Review.

Review: Review behavior once daily for five days. If S responds correctly to 80% of the trials put on Maintenance. If S does not, return to program at a Level 5.

Maintenance: Review once weekly for five weeks. If S responds correctly to 80% of the trials discontinue the program. If S does not, return to Review.

Probes: Present trial for the next program in the strand.

Materials: Flannelboard face and/or picture with separate pieces for body parts.

## PENCIL GRASP PROGRAM

Behavior Taught: On three consecutive trials sitting at the table in a group S will pick up crayon with left hand and place in right hand with pencil grasp (between thumb and 1st two fingers) and color for 5 seconds. S will initiate within 5 seconds of command "Color".

Baseline: Test target behavior on 5 separate occasions, if responds appropriately on 4/5 trials go to next program. If S does not, see program below.

Steps: (1) S will pull left hand away independently after being guided to pick up crayon in left hand and place in open right hand. E will guide S to close right hand in pencil grasp and color 5 seconds.

(2) S will place crayon in right hand and pull left hand away independently after being guided to pick up crayon in left hand E will guide S to close right hand in pencil grasp and color 5 seconds.

(3) S will pick up crayon with left hand, place in right hand and pull left hand away independently. E will guide to close right hand in pencil grasp and color 5 seconds.

(4) S will pick up crayon with left hand, place in right hand, pull left hand away and close right hand into pencil grasp independently. E will guide S to maintain grasp while coloring 5 seconds.

(5) S will pick up crayon with left hand and place in right hand with pencil grasp and color 5 seconds.

Procedure: Give attending signal before all trials. Socially reinforce all correct responses with direct feedback. After three consecutive correct responses move to the next level of prompting. If S makes no response (NR) or an incorrect response (X), return to the previous level and reach criteria at that level before moving up. If the child completes the terminal behavior on command, score with a star (*). After three stars put behavior on Review.

Level 1 - Complete physical guidance, use of an appropriate gesture and verbal prompt. Score 1.

Level 2 - One finger guidance, use of an appropriate gesture and verbal prompt. Score 2.

Level 3 - Gesture and appropriate verbal prompt. Score 3.

Level 4 - Appropriate verbal prompt. Score 4. (There may be more depending on the program)

Level 5 - On command. Score 5.

Gradually fade the level of guidance or prompting over the three trials at each level.

If S responds correctly on command before prompts can be given, score with a circle around the level he/she should be working on. After 5 consecutive circled numbers put on review.

Review: Review behavior once daily for five days. If S responds correctly to 80% of the trials put on Maintenance. If S does not, return to program at a Level 5.

Maintenance: Review once weekly for five weeks. If S responds correctly to 80% of the trials discontinue the program. If S does not, return to Review.

Probes: Present trial for the next program in the strand.

## VERTICAL STROKES PROGRAM
## (without guide)

Behavior Taught: On 3 consecutive trials when sitting at the table and given a crayon (pencil size) S will draw a 3" vertical line on a sheet of paper from the top green dot to the bottom red dot between 2 parallel lines 1/2" apart on the command "Draw a line". Response must be initiated within 5 seconds and completed within 15 seconds of command. S will hold crayon in a pencil grasp on 3 consecutive trials.

Baseline: When seated at the table give S baseline sheet (see materials) and a crayon. E says "Draw a line". If responds appropriately on 4/5 trials go to next program. If S does not, see program below.

Steps:
(1) S will draw first 1/4" of vertical line from dot to dot
(2) S will draw first 1/2" of vertical line from dot to dot
(3) S will draw first 3/4" of vertical line from dot to dot
(4) S will draw complete 3" line from dot to dot.

Procedure: Give attending signal before all trials. S sits at table in a group. Procedure is the same as Writing program #1(a), but use appropriate sheet for the step, S is working on. Verbal prompts, "start", "stop". Socially reinforce all correct responses with direct feedback. After three consecutive correct responses move to the next level of prompting. If S makes no response (NR) or an incorrect response return to the previous level and reach criteria at that level before moving.

Level 1 - Complete physical guidance, use of an appropriate gesture and verbal prompt. Score 1.

Level 2 - One finger guidance, use of an appropriate gesture and verbal prompt. Score 2.

Level 3 - Gesture and appropriate verbal prompt. Score 3.

Level 4 - Appropriate verbal prompt. Score 4.
(There may be more depending on the program)

Level 5 - On command. Score 5.

Gradually fade the level of guidance or prompting over the three trials at each level.

If S responds correctly on command before prompts can be given, score with a circle around the level he/she should be working on. After five consecutive circled numbers put on Review. If the child completes the terminal behavior on command, score with a star (*). After three stars put behavior on Review.

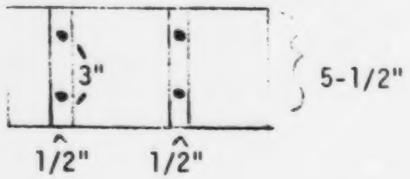
Review: Review behavior once daily for five days. If S responds correctly to 80% of the trials put on Maintenance. If S does not, return to program at a Level 5.

.../2

Maintenance: Review once weekly for five weeks. If S responds correctly to 80% of the trials discontinue the program. If S does not, return to Review.

Probes: Present trial for the next program in the strand.

Materials: Baseline sheet.



## DRAW A CIRCLE PROGRAM

Behavior Target: On 3 consecutive trials when sitting at the table and given a pencil sized crayon and a sheet of paper 8-1/2" x 5-1/2" S will draw a circle by starting at the top of the circle, with a counter clockwise motion joining circle at starting point. Response must be initiated within 5 seconds and completed within 20 seconds of command. S will hold crayon in pencil grasp on 3 consecutive trials.

Baseline: When seated at the table give S a sheet of paper 8-1/2" x 5-1/2" and a crayon. E says "Draw a circle", if S responds appropriately on 4/5 trials go to next program. If S does not, see program below.

Steps: (1) S will draw last 1/4 of circle
(2) S will draw last 1/2 of circle
(3) S will draw last 3/4 of circle
(4) S will draw complete circle with model presented
(5) S will draw complete circle, without model

Procedure: Give attending signal before all trials. Socially reinforce all correct responses with direct feedback. After three consecutive correct responses move to the next level of prompting. If S makes no response (NR) or an incorrect response return to the previous level and reach criteria at that level before moving up.

Level 1 - Complete physical guidance, use of an appropriate gesture and verbal prompt. Score 1.

Level 2 - One finger guidance, use of an appropriate gesture and verbal prompt. Score 2.

Level 3 - Gesture and appropriate verbal prompt. Score 3.

Level 4 - Appropriate verbal prompt. Score 4. (There may be more depending on the program).

Level 5 - On command. Score 5.

Gradually fade the level of guidance or prompting over the three trials at each level.

If S responds correctly on command before prompts can be given, score with a circle around the level he/she should be working on. After five consecutive circled numbers put on Review. If the child completes the terminal behavior on command, score with a star (*). After three stars put behavior on Review.

Review: Review behavior once daily for five days. If S responds correctly to 80% of the trials put on Maintenance. If S does not, return to program at a Level 5.

Maintenance: Review once weekly for five weeks. If S. responds correctly to 80% of the trials discontinue the program. If S does not, return to Review.

Probes: Present trial for the next program in the strand.

Materials: sheet of paper 8-1/2" x 5-1/2" and a pencil sized crayon.

## CRAWLING PROGRAM 1: POSTURE

Behavior Taught (target):

Child will hold self in hands and knees posture for 10 seconds with

(a) hands open and fingers forward
(b) back flat
(c) head looking forward: after being placed in this position with the instruction "look up".

Directions for Teaching:

Baseline:

Teacher will place child in hands and knees posture and give instruction "look up". A toy is placed at eye level in front of child. If child will hold himself in crawl posture as specified above for 10 seconds on 4/5 trials, proceed to next program. If not, proceed to program below.

Steps:

1. Child is prone on stomach and hold head up with

    (a) weight supported on open hands
    (b) fingers pointed forward
    (c) elbows straight for five seconds

    If child does not hold his head up refer back to head control prone program.

2. Child sits back on heels with

    (a) weight supported on open hands
    (b) fingers forward
    (c) hands directly under shoulders
    (d) head looking forward for five seconds

3. Child maintains hands and knees position with

    (a) hands open and fingers forward
    (b) head looking forward for five seconds

4. Child maintains target behavior posture for 10 seconds with

    (a) hands open and fingers forward
    (b) head looking forward in direction of movement
    (c) back flat.

Procedure: Place child in posture appropriate to the step and give instruction "look up". A toy is placed at eye level in front of the child.

For Steps 1 and 2:

If child has clenched fists first stroke closed fist on floor then stretch closed fist into more flexion and open hand placing it flat on floor with fingers forward.

Levels: (1) Teacher and child maximal guidance to maintain appropriate posture. Record "1" N.B. Immediately before each trial teacher applies momentary stretch, a quick forceful push as indicated below:

Step 1 & 2: Teacher places his hands on child's shoulders and pushes down perpendicular to the floor.

Step 3: Teacher places his hands on child's hips and pushes down perpendicular to the floor.

Step 4: Teacher places his hands on child's back and pushes down gently towards floor.

(2) Teacher gives minimal guidance to maintain appropriate posture. Record "2". Stretch is applied immediately before each trial as in level 1.

(3) Teacher gestures to child to maintain the appropriate posture or or models the appropriate posture. Record "3". N.B. During the entire trial Teacher applies resistance to child. The resistance must be applied smoothly. It must be enough to make child put out some effort but never so great as to prevent motion or push him out of the position. It is applied in the same position and direction as the stretch in level 1 above. The resistance is faded out during the series of trials.

(4) Teacher gives an additional verbal prompt. "Look up", "look at me" in order to maintain the posture. Record "4".

(5) Teacher gives command. Score "5".

After 5 correct scores on three consecutive trials, move to next level. If an incorrect response or no response is made, score "x" and drop back to a previous level. Reach criterion at that level and continue to gradually fade level of guidance over the three trials for each level.

Skipping procedure: After 5 consecutive subscripts "5" move to review.

Review Trials: Test once a day for five days. If 80% is attained, proceed to next program; if not, return to program.

Maintenance: N/A.

Material: None.

# WASHES HANDS AND FACE PROGRAM

Behavior Target: On 3 consecutive trials S washes hands and face with water, dries. S will wash hands in water, rub wet hands over face, then dry hands and face with towel on command "Wash hands and face".

Baseline: Sit S in front of basin of water with a towel folded to the left of the basis. If S begins to wash hands and face (as specified below step 6) within 5 seconds of the command and completes the tasks within 60 seconds of the command on 4/5 trials go to next grooming program. If not, proceed with program below.

Steps:
(1) S rubs wet face with towel until no moisture remains
(2) S rubs wet hands and face with towel until no moisture remains
(3) S picks up towel and dries hands and face
(4) S rubs wet hands on cheeks, mouth, chin, nose and forehead, picks up towel and dries hands and face.
(5) S rubs hands in water, washes face, picks up towel and dries hands and face.

Procedure: Give attending signal before all trials. E sits S in front of basis of water with towel folded to left side of basin and gives command appropriate to the step. Socially reinforce all correct responses with direct feedback. After three consecutive correct responses move to the next level of prompting. If S makes no response (NR) or an incorrect response return to the previous level and reach criteria at that level before moving up.

Level 1 - Complete physical guidance, use of an appropriate gesture and verbal prompt. Score 1.

Level 2 - One finger guidance, use of an appropriate gesture and verbal prompt. Score 2.

Level 3 - Gesture and appropriate verbal prompt. Score 3.

Level 4 - Appropriate verbal prompt. Score 4.
(There may be more depending on the program).

Level 5 - On command. Score 5.

Gradually fade the level of guidance or prompting over the three trials at each level.

If S responds correctly on command before prompts can be given, score with a circle around the level he/she should be working on. After five consecutive circled numbers put on Review. If the child completes the terminal behavior on command, score with a star (*). After three stars put behavior on Review.

Review: Review behavior once daily for five days. If S responds correctly to 80% of the trials put on Maintenance. If S does not, return to program at a Level 5.

Maintenance: Review once weekly for five weeks. If S responds correctly to 80% of the trials discontinue the program. If S does not, return to Review.

Probes: Present trial for the next program in the strand.

Materials: One wash basin, towels.

## COAT ON PROGRAM

Behavior Taught: S will put on unfastened open front coat, sweater or jacket on command "Coat on". S will initiate on command within 5 seconds and complete activity in 30 seconds.

Baseline: E gives command "Coat on" on 5 separate occasions. If S responds appropriately on 4/5 trials go to next program. If S does not, see program below.

Steps:
(1) S puts on coat when right side on shoulder (right arm in sleeve) left arm in above elbow.
(2) S puts on coat when right side on shoulder, left hand in sleeve.
(3) S puts on coat when right arm is in.
(4) S puts on coat when right hand started in sleeve.
(5) S puts on coat when guided to hold right side
(6) S puts on coat when handed to him.

Procedure: E gives command "Coat on". Socially reinforce all correct responses with direct feedback. After three consecutive correct responses move to the next level of prompting. If S makes no response (NR) or an incorrect response (X), return to the previous level and reach criteria at that level before moving up. After three consecutive correct level 5 trials put on Review.

Level 1 - Complete physical guidance, use of an appropriate gesture and verbal prompt. Score 1.

Level 2 - One finger guidance, use of an appropriate gesture and verbal prompt. Score 2.

Level 3 - Gesture and appropriate verbal prompt. Score 3.

Level 4 - Appropriate verbal prompt. Socre 4. (There may be more depending on the program)

Level 5 - On command. Score 5.

Gradually fade the level of guidance or prompting over the three trials at each level.

If S responds correctly on command before prompts can be given, score with a circle around the level he/she should be working on. After five consecutive circled numbers put on Review.

Review: Review behavior once daily for five days. If S responds correctly to 80% of the trials put on Maintenance. if S does not, return to program at a Level 5.

Maintenance: Review once weekly for five weeks. If S responds correctly to 80% of the trials discontinue the program. If S does not, return to Review.

Probes: Present trial for the next program in the strand.

Material: one jacket.

## SOCK ON PROGRAM

Behavior Taught: S will put sock on foot by grasping each side with thumbs when handed sock on command "sock on" S will initiate within 5 seconds and complete within 30 seconds of command.

Baseline: E will give S command "Sock on" on 5 separate occasions. If S responds appropriately on 4/5 trials go to next program. If S does not, see program below.

Steps:
(1) S puts on sock by grasping each side with thumbs when just above heel.
(2) S puts on sock by grasping each side with thumbs when just below heel.
(3) S puts on sock by grasping each side with thumbs when toes are started in.
(4) S puts on sock by grasping each side with thumbs when sock handed to him/her.

Procedure: E. gives command "Sock on". Socially reinforce all correct responses with direct feedback. After three consecutive correct responses move to the next level of prompting. If S makes no response (NR) or an incorrect response (X), return to the previous level and reach criteria at that level before moving up. After three consecutive correct Level 5 trials put on Review.

Level 1 - Complete physical guidance, use of an appropriate gesture and verbal prompt. Score 1

Level 2 - One finger guidance, use of an appropriate gesture and verbal prompt. Score 2

Level 3 - Gesture and appropriate verbal prompt. Score 3

Level 4 - Appropriate verbal prompt. Score 4
(There may be more depending on the program)

Level 5 - On command. Score 5

Gradually fade the level of guidance or prompting over the three trials at each level.

If S responds correctly on command before prompts can be given, score with a circle around the level he/she should be working on. After five consecutive circled numbers put on Review.

Review: Review behavior once daily for five days. If S responds correctly to 80% of the trials put on Maintenance. If S does not, return to program at a Level 5.

Maintenance: Review once weekly for five weeks. If S responds correctly to 80% of the trials discontinue the program. If S does not, return to Review.

Probes: Present trial for the next program in the strand.

Material: 1 sock.

# APPENDIX D

# INCIDENTAL TEACHING METHODS

## Incidental Teaching

### Situation 1 - Child Selected and Initiated Activities

In this situation, the child indicates either through gestures or through verbalization that he would like to obtain something from the teacher. A number of situations have been utilized to encourage the child's initiation of language with the teachers and parents in the classroom.

### Preschool Classroom

#### Dressing and Toileting

(a) The child indicates to a parent or teacher by gesture or verbalization that he or she requires help to put on or take off an article of clothing or get on or off the potty or toilet. The teacher responds with "want help?" or "want up?"

(b) If the child is trying to tie shoelaces, do buttons, or a similar activity, the teacher asks "want help?"

#### Playing with Objects in the Classroom

(a) The child indicates by word or gesture that he/she requires help to utilize an object. The teacher responds "want help?"

(b) The child attempts to operate an object unsuccessfully but does not ask for help, for example, the child is at the chalkboard looking for chalk. The teacher or parent holds the chalk and asks "what want?"

#### The Child Requests Objects that are Inaccessible

(a) The child indicates to teacher or parent by word or gesture that he/she requires help to obtain a toy or object.

(b) The child attempts to obtain an object or toy that is inaccessible (for example, more juice or treats at juice time, or toys).

### Toddler Classroom:

#### Incidental Dressing and Toileting

(a) The child indicates to teacher or parent by gesture or verbalization that he/she requires help to put on or take off an article of clothing or get on or off the potty.

(b) The child is having difficulty putting on or taking off an article of clothing or getting on or off the potty but does not ask for help.

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The Child Requires Assistance in Playing with an Object or Toy in the Classroom (for example, turning the crank on a jack-in-the-box, place small Fisher Price man in bus, etc.)

(a) The child indicates by word or gesture that he/she requires help to play with an object or operate the toy.

(b) The child attempts to operate the toy or object but is unable to do so and does not request assistance.

The Child Requests Objects that are out of Reach or Inaccessible (for example, child requests juice at a time other than juice time or requests a toy that is on top shelf or behind plexiglass)

(a) The child indicates to the teacher or parent by word or gesture that he/she requires help to obtain an object or toy.

(b) The child attempts to obtain an object that is out of reach or inaccessible.

## Situation 2 - Teacher Selected and Initiated Activities

The second condition in which incidental teaching procedures have been instituted is in a teacher selected and initiated situation. In this instance, the child is engaged in an activity where, although there is not any assistance required by the child, the teacher is able to initiate an intervention designed to facilitate teaching and further introduce the child to the idea that a request, however limited, will result in assistance or help.

### Toddler Classroom

### Guided Play

(a) Picking up toys - teacher says "put toys on shelf"
"pick up----"

(b) The child is looking at a book - teacher says "show me----" (for known words or for new words) teacher says "Here's a --. Say--"

(c) Child is playing with a toy - teacher says "What's that?" or teacher asks "Is this a --?"

(d) Playing catch - teacher says "What want?"
child says "ball" or "want ball"
teacher throws the ball to child

### Playing House

(a) The child is playing with an object.
The teacher says "What's that?" or "That's a --. Say --"

(b) Child is playing with an object inappropriately (e.g. putting and iron in with the dishes), teacher says "That's an --. Do this" and models appropriate behavior for the child.

(c) The child is playing appropriately with objects (e.g. eating with a fork and plate). The teacher gives the child an additional object (e.g. knife) and says "Here's a --" The child doesn't use the added object appropriately. The teacher models and says "Do this --_ (e.g. cut).

(d) The child is playing appropriately (eating with fork and plate) a teacher extends or adds a new activity (washing dishes). The teacher says "Let's --"

### Juice Time

(a) The teacher holds juice or a snack and asks "What want?" The child responds "want --" or "(labels object)" or "more --".

(b) When the child is finished with the snack, the teacher says "I want a cup". The child gives the cup to teacher.

(c) If the child has any refuse from the snack, the teacher says "Put -- in garbage."

### Wiping Nose

The child sneezes or has a running nose. The teacher hands the child a kleenex and says "wipe nose."

### Coughing

The child coughs. The teacher models covering the mouth when coughing. The teacher gives command "Do this, hand on mouth."

### When the child W-sits on the Floor

The teacher says "feet forward".

Additional Situations in Which Instructions are Provided are the Following:

| Commands | Some Possible Materials |
|---|---|
| Put in<br>Take out | names in chart, tokens in cup, pegs in board, sand in pails |
| Give to<br>Bring me | toys, block |

| Commands | Some Possible Materials |
|---|---|
| Is this your --<br>Is this a -- | clothes, pictures, toys |
| Pick up | tokens, toys, blocks |
| Put on | toy/shelves, dishes/table, clothing/child, figure/flannel board |
| What want<br>Bring me | any objects |
| Pour | sand, water, juice |

## Toddler Classroom

**Freeplay** - incidental teaching for individual or groups of two or of two or more (teacher and parent initiated).

(a) Put in - teacher sits child down on rug (with 1/2" yellow blocks and large bowl)
- teacher gives child block and command "Put in"
- teacher holds out bowl to child

(b) Take out - teacher sits child down on rug
- teacher shows child bowl with block(s) in and gives command "Take out"
- teacher holds out bowl to child

(c) Give to - using above example situations
- teacher gives block to child and gives command "Give to" (i.e., Danny give to Steven. Steven put in")
- teacher holds bowl of block and vives command "Take out". "Give to Steven, Steven give to me or --(names)".

(d) Put on - teacher gives child stacking ring or block and commands "Put on".

(e) Take off - teacher presents stack of rings on peg to child and gives command "Take off"

(f) Give to - using above example and situations
- teacher gives ring to Danny giving command, i.e., "Danny give to Steven, Steven put on"
- teacher gives command, i.e. "Danny take off, give to Steven, Steven give to me."

(g) Hit - teacher holds out drum and gives the child the drum stick. The teacher gives command "Hit drum"

Give to - teacher using incident above, i.e., "Danny hit, Danny give to Steven (stick)"

(h) Push - teacher gives the child car and commands "push" (car with wheel and string attached)

Pull - teacher gives the child car with string and commands "pull"

(i) Throw in - teacher gives the child bean bag and commands "throw in" (basketball game)

(j) Pick up - teacher drops block in front of the child and gives command "pick up" (e.g., Pick up Danny, give to
put in
throw in

(k) Go get - teacher places row of block on shelf and gives command "Go get"
- teacher holds out hands and gives command "give -- to me"/bring me

Juice Time - Come here (to the table)

(a) The teacher stands at table and gives command "come here"

(b) Want juice - teacher points to juice cup. Teacher prompts child to point to cup, gesture towards cup or make sound. Teacher then gives the child juice.

(c) Want cookie - teacher points to cookie. Teacher prompts child to point to cookie, gesture towards cookie or make sound. Teacher then gives child cookie.

Self-Help

(a) Wiping nose - child sneezes or has running nose. Teacher hands child kleenex and gives command "wipe nose"

(b) Coughing - child coughs. The teacher models covering mouth. When coughing, the teacher gives command, Do this, hand on mouth"

# APPENDIX E

# RAW DATA FOR NORMATIVE TESTS OF MENTAL DEVELOPMENT, RECEPTIVE LANGUAGE, AND EXPRESSIVE LANGUAGE

## APPENDIX E

## RAW DATA FOR MENTAL AGE, VERBAL AGE, AND EXPRESSIVE AGE RATIOS WITH CHRONOLOGICAL AGE

### HOME PROGRAM MA/CA

| | Test 1 | | | Test 2 | | | Test 3 | | | Test 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CA | MA | R | CA | MA | R | CA | MA | R | CA | MA | R |
| $C_{23}$ | 7 | 7 | 1.0 | 16 | 15 | .93 | 27 | 19 | .70 | - | - | - |
| $C_{24}$ | 15 | 6 | .40 | 24 | 14 | .58 | 29 | 17 | .59 | - | - | - |
| $C_{25}$ | 10 | 6 | .60 | 18 | 11 | .61 | 30 | 18 | .60 | - | - | - |
| $C_{26}$ | 10 | 7 | .70 | 18 | 15 | .83 | 25 | 17 | .68 | - | - | - |
| $C_{27}$ | 12 | 8 | .67 | 17 | 14 | .82 | 25 | 18 | .72 | - | - | - |
| $C_{28}$ | 19 | 5 | .26 | 25 | 12 | .48 | 32 | 16 | .50 | 36 | 18 | .50 |
| $C_{29}$ | 16 | 13 | .81 | 23 | 18 | .78 | 28 | 21 | .75 | - | - | - |
| $C_{30}$ | 8 | 3 | .38 | 16 | 10 | .63 | - | - | - | - | - | - |
| $C_{31}$ | 7 | 6 | .86 | 15 | 13 | .87 | - | - | - | - | - | - |
| $C_{32}$ | 5 | 3 | .60 | 13 | 11 | .85 | 18 | 12 | .66 | - | - | - |
| $C_{33}$ | 15 | 12 | .80 | 23 | 17 | .74 | - | - | - | - | - | - |
| $C_{34}$ | 6 | 4 | .67 | 12 | 10 | .83 | 16 | 14 | .88 | - | - | - |
| $C_{35}$ | 20 | 6 | .30 | 26 | 11 | .42 | 30 | 13 | .43 | - | - | - |
| $C_{36}$ | 19 | 5 | .26 | 27 | 14 | .52 | - | - | - | - | - | - |
| $C_{37}$ | 24 | 10 | .42 | 30 | 14 | .47 | - | - | - | - | - | - |
| $C_{38}$ | 6 | 4 | .67 | 12 | 8 | .66 | - | - | - | - | - | - |
| $C_{39}$ | 31 | 24 | .77 | 36 | 30 | .83 | - | - | - | - | - | - |
| $C_{40}$ | 4 | 3 | .75 | 12 | 10 | .83 | - | - | - | — | - | - |
| $C_{41}$ | 3 | 2 | .67 | 10 | 8 | .80 | - | - | - | - | - | - |

## SCHOOL PROGRAM MA/CA

| | | Test 1 | | | Test 2 | | | Test 3 | | | Test 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CA | MA | R | CA | MA | R | CA | MA | R | CA | MA | R |
| Preschool Class | $C_1$ | 60 | 22 | .36 | 68 | 28 | .41 | 71 | 29 | .40 | - | - | - |
| | $C_2$ | 39 | 20 | .51 | - | - | - | 53 | 34 | .64 | - | - | - |
| | $C_3$ | 55 | 30 | .54 | 64 | 32 | .50 | 67 | 39 | .58 | - | - | - |
| | $C_4$ | - | - | - | 57 | 22 | .38 | 65 | 29 | .45 | - | - | - |
| | $C_5$ | 36 | 22 | .61 | - | - | - | 44 | 36 | .74 | - | - | - |
| | $C_6$ | 54 | 20 | .37 | 60 | 20 | .33 | 66 | 22 | .33 | - | - | - |
| | $C_7$ | 32 | 18 | .56 | 38 | 29 | .76 | 45 | 33 | .73 | - | - | - |
| | $C_8$ | 42 | 23 | .54 | 46 | 27 | .59 | 50 | 29 | .59 | - | - | - |
| | $C_9$ | 69 | 23 | .33 | 74 | 31 | .42 | - | - | - | - | - | - |
| | $C_{10}$ | - | - | - | - | - | - | - | - | - | - | - | - |
| Toddler Class | $C_{11}$ | 42 | 15 | .36 | 45 | 13 | .28 | 52 | 22 | .42 | 57 | 20 | .35 |
| | $C_{12}$ | 27 | 14 | .51 | 36 | 19 | .52 | 39 | 21 | .53 | 44 | 20 | .45 |
| | $C_{13}$ | 60 | 14 | .23 | 67 | 17 | .25 | 72 | 22 | .30 | - | - | - |
| | $C_{14}$ | 21 | 12 | .57 | 31 | 19 | .61 | 35 | 24 | .68 | 40 | 22 | .55 |
| | $C_{15}$ | 30 | 6 | .20 | 39 | 18 | .46 | 42 | 18 | .43 | - | - | - |
| | $C_{16}$ | 22 | 14 | .63 | 31 | 16 | .51 | 35 | 19 | .54 | 40 | 21 | .53 |
| | $C_{17}$ | 20 | 8 | .40 | 27 | 13 | .48 | 34 | 22 | .65 | 38 | 21 | .55 |
| | $C_{18}$ | 31 | 14 | .45 | 38 | 19 | .50 | 42 | 20 | .48 | 47 | 22 | .47 |
| | $C_{19}$ | 67 | 11 | .16 | 75 | 16 | .21 | 81 | 21 | .25 | 84 | 19 | .22 |
| | $C_{20}$ | 24 | 9 | .38 | 31 | 13 | .42 | 37 | 15 | .40 | 41 | 16 | .39 |
| | $C_{21}$ | 22 | 10 | .45 | 30 | 19 | .63 | 38 | 26 | .68 | 41 | 27 | .65 |
| | $C_{22}$ | 24 | 13 | .54 | - | - | - | 38 | 21 | .60 | - | - | - |

## HOME PROGRAM VA/CA

| | Test 1 | | | Test 2 | | | Test 3 | | | Test 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CA | VA | R | CA | VA | R | CA | VA | R | CA | VA | R |
| $C_{23}$ | 7 | 7 | 1.0 | 16 | 13 | .81 | 27 | 17 | .63 | - | - | - |
| $C_{24}$ | 15 | 7 | .47 | 24 | 11 | .46 | 29 | 20 | .69 | - | - | - |
| $C_{25}$ | 10 | 7 | .70 | 18 | 11 | .61 | 30 | 14 | .47 | - | - | - |
| $C_{26}$ | 10 | 7 | .70 | 18 | 11 | .61 | 25 | 14 | .56 | - | - | - |
| $C_{27}$ | 12 | 7 | .58 | 17 | 10 | .59 | 25 | 21 | .84 | - | - | - |
| $C_{28}$ | - | - | - | 25 | 7 | .28 | 32 | 10 | .31 | 36 | 15 | .41 |
| $C_{29}$ | 16 | 11 | .69 | 23 | 19 | .83 | 28 | 22 | .79 | - | - | - |
| $C_{30}$ | 8 | <7 | .01 | 16 | 9 | .56 | - | - | - | - | - | - |
| $C_{31}$ | 7 | 7 | 1.0 | 15 | 11 | .73 | - | - | - | - | - | - |
| $C_{32}$ | - | - | - | 13 | 9 | .69 | 18 | 9 | .50 | - | - | - |
| $C_{33}$ | 15 | 8 | .53 | 23 | 10 | .43 | - | - | - | - | - | - |
| $C_{34}$ | 6 | <7 | .01 | 12 | 7 | .58 | 16 | 10 | .63 | - | - | - |
| $C_{35}$ | 20 | <7 | .01 | 26 | 10 | .38 | 30 | 10 | .33 | - | - | - |
| $C_{36}$ | 19 | <7 | .01 | 27 | 17 | .63 | - | - | - | - | - | - |
| $C_{37}$ | 24 | 6 | .25 | 31 | 13 | .42 | - | - | - | - | - | - |
| $C_{38}$ | 6 | <7 | .01 | 12 | 7 | .58 | - | - | - | - | - | - |
| $C_{39}$ | 31 | 26 | .84 | 37 | 34 | .92 | - | - | - | - | - | - |
| $C_{40}$ | - | - | - | - | - | - | - | - | - | - | - | - |
| $C_{41}$ | - | - | - | - | - | - | - | - | - | - | - | - |

## SCHOOL PROGRAM VA/CA

| | | Test 1 | | | Test 2 | | | Test 3 | | | Test 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CA | VA | R | CA | VA | R | CA | VA | R | CA | VA | R |
| Preschool Class | $C_1$ | 59 | 21 | .35 | 66 | 24 | .36 | 71 | 30 | .42 | - | - | - |
| | $C_2$ | 38 | 11 | .29 | 45 | 19 | .42 | 54 | 26 | .48 | 56 | 30 | .54 |
| | $C_3$ | 55 | 21 | .38 | 60 | 22 | .37 | 67 | 33 | .49 | 72 | 30 | .42 |
| | $C_4$ | 49 | 7 | .14 | 56 | 14 | .25 | 63 | 22 | .35 | 68 | 25 | .38 |
| | $C_5$ | 34 | 17 | .50 | 41 | 26 | .63 | 47 | 31 | .66 | 52 | 33 | .63 |
| | $C_6$ | 53 | 9 | .17 | 59 | 18 | .31 | 66 | 20 | .30 | 71 | 23 | .32 |
| | $C_7$ | 32 | 11 | .34 | 38 | 26 | .68 | 43 | 29 | .67 | 48 | 28 | .58 |
| | $C_8$ | - | - | - | 46 | 22 | .48 | 50 | 24 | .48 | - | - | - |
| | $C_9$ | - | - | - | 73 | 26 | .36 | 77 | 32 | .42 | - | - | - |
| | $C_{10}$ | 59 | 34 | .58 | 62 | 38 | .61 | - | - | - | - | - | - |
| Toddler Class | $C_{11}$ | 39 | 6 | .15 | 45 | 6 | .13 | 52 | 11 | .21 | 57 | 20 | .35 |
| | $C_{12}$ | 27 | 9 | .33 | 33 | 10 | .30 | 40 | 15 | .38 | 45 | 18 | .40 |
| | $C_{13}$ | 59 | 7 | .12 | 66 | 7 | .11 | 73 | 13 | .18 | - | - | - |
| | $C_{14}$ | 24 | 11 | .46 | 28 | 14 | .50 | 35 | 21 | .60 | 40 | 23 | .58 |
| | $C_{15}$ | 31 | <7 | .01 | 37 | 14 | .38 | 42 | 10 | .24 | - | - | - |
| | $C_{16}$ | 24 | 7 | .29 | 28 | 8 | .29 | 35 | 16 | .46 | 40 | 28 | .70 |
| | $C_{17}$ | - | - | - | 27 | 7 | .26 | 33 | 15 | .45 | 38 | 24 | .63 |
| | $C_{18}$ | 30 | <7 | .01 | 35 | 7 | .20 | 42 | 19 | .45 | 47 | 23 | .49 |
| | $C_{19}$ | 66 | 7 | .11 | 72 | 9 | .13 | 79 | 11 | .13 | 84 | 15 | .18 |
| | $C_{20}$ | 24 | 0 | .01 | 31 | 7 | .23 | 37 | 11 | .30 | 41 | 13 | .32 |
| | $C_{21}$ | - | - | - | 30 | 18 | .60 | 36 | 21 | .58 | 41 | 26 | .63 |
| | $C_{22}$ | 24 | 12 | .50 | - | - | - | 35 | 24 | .69 | - | - | - |

## HOME PROGRAM EA/CA

| | Test 1 | | | Test 2 | | | Test 3 | | | Test 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EA | CA | R | EA | CA | R | EA | CA | R | EA | CA | R |
| $C_{23}$ | 7 | 6 | .86 | 16 | 11 | .69 | 27 | 18 | .67 | - | - | - |
| $C_{24}$ | 15 | 6 | .40 | 24 | 11 | .46 | 29 | 19 | .66 | - | - | - |
| $C_{25}$ | 10 | 6 | .60 | 18 | 9 | .50 | 30 | 18 | .60 | - | - | - |
| $C_{26}$ | 10 | 6 | .60 | 18 | 13 | .72 | 25 | 15 | .60 | - | - | - |
| $C_{27}$ | 7 | 6 | .86 | 17 | 14 | .82 | 25 | 18 | .72 | - | - | - |
| $C_{28}$ | - | - | - | 25 | 9 | .36 | 32 | 10 | .31 | 36 | 15 | .42 |
| $C_{29}$ | 16 | 11 | .69 | 23 | 18 | .78 | 22 | 18 | .64 | - | - | - |
| $C_{30}$ | 8 | 6 | .75 | 16 | 9 | .56 | - | - | - | - | - | - |
| $C_{31}$ | 7 | 6 | .86 | 15 | 13 | .87 | - | - | - | - | - | - |
| $C_{32}$ | - | - | - | 13 | 17 | .54 | 18 | 9 | .50 | - | - | - |
| $C_{33}$ | 15 | 10 | .66 | 23 | 13 | .52 | - | - | - | - | - | - |
| $C_{34}$ | 6 | 6 | 1.0 | 12 | 6 | .50 | 16 | 9 | .56 | - | - | - |
| $C_{35}$ | 20 | 6 | .30 | 26 | 10 | .38 | 30 | 10 | .33 | - | - | - |
| $C_{36}$ | 19 | 0 | .01 | 27 | 6 | .22 | - | - | - | - | - | - |
| $C_{37}$ | 24 | 6 | .25 | 30 | 10 | .30 | - | - | - | - | - | - |
| $C_{38}$ | - | - | - | - | - | - | - | - | - | - | - | - |
| $C_{39}$ | 31 | 26 | .84 | 37 | 32 | .86 | - | - | - | - | - | - |
| $C_{40}$ | - | - | - | - | - | - | - | - | - | - | - | - |
| $C_{41}$ | - | - | - | - | - | - | - | - | - | - | - | - |

SCHOOL PROGRAM EA/CA

| | | Test 1 | | | Test 2 | | | Test 3 | | | Test 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | EA | CA | R | EA | CA | R | EA | CA | R | EA | CA | R |
| Preschool Class | $C_1$ | 59 | 15 | .25 | 66 | 23 | .35 | 71 | 26 | .37 | - | - | - |
| | $C_2$ | 38 | 13 | .34 | 45 | 28 | .62 | 54 | 29 | .54 | 56 | 30 | .54 |
| | $C_3$ | 55 | 24 | .43 | 60 | 23 | .38 | 67 | 26 | .39 | 72 | 26 | .38 |
| | $C_4$ | 49 | 19 | .39 | 56 | 25 | .45 | 63 | 25 | .40 | 68 | 28 | .41 |
| | $C_5$ | 34 | 18 | .53 | 41 | 21 | .51 | 47 | 24. | .51 | 52 | 28 | .54 |
| | $C_6$ | 53 | 14 | .26 | 59 | 17 | .29 | 66 | 22 | .33 | 71 | 24 | .34 |
| | $C_7$ | 32 | 11 | .34 | 38 | 21 | .55 | 43 | 22 | .51 | 48 | 22 | .46 |
| | $C_8$ | - | - | - | 46 | 19 | .41 | 50 | 23 | .46 | - | - | - |
| | $C_9$ | - | - | - | 73 | 25 | .34 | 77 | 25 | .32 | - | - | - |
| | $C_{10}$ | 59 | 27 | .46 | 62 | 32 | .52 | - | - | - | - | - | - |
| Toddler Class | $C_{11}$ | 39 | 6 | .15 | 45 | 9 | .20 | 52 | 11 | .21 | 57 | 12 | .21 |
| | $C_{12}$ | 27 | 9 | .33 | 33 | 11 | .33 | 40 | 18 | .45 | 45 | 20 | .44 |
| | $C_{13}$ | 59 | 6 | .10 | 66 | 12 | .18 | 73 | 13 | .18 | - | - | - |
| | $C_{14}$ | 24 | 7 | .24 | 28 | 13 | .46 | 35 | 23 | .66 | 40 | 22 | .55 |
| | $C_{15}$ | 31 | $< 7$ | .01 | 37 | 13 | .35 | 42 | 10 | .24 | - | - | - |
| | $C_{16}$ | 24 | $< 7$ | .01 | 28 | 9 | .32 | 35 | 17 | .49 | 40 | 22 | .55 |
| | $C_{17}$ | - | - | - | 27 | 7 | .26 | 33 | 14 | .42 | 38 | 24 | .63 |
| | $C_{18}$ | 30 | 6 | .20 | 35 | 9 | .26 | 42 | 15 | .36 | 47 | 22 | .47 |
| | $C_{19}$ | 66 | 7 | .11 | 72 | 10 | .14 | 79 | 11 | .14 | 84 | 14 | .17 |
| | $C_{20}$ | 24 | 0 | .01 | 31 | 7 | .23 | 37 | 9 | .24 | 41 | 12 | .30 |
| | $C_{21}$ | - | - | - | 30 | 18 | .60 | 36 | 20 | .55 | 41 | 27 | .66 |
| | $C_{22}$ | 24 | 14 | .58 | - | - | - | 35 | 26 | .74 | - | - | - |